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THE UNIVERSITY OF ALBERTA

THE ECONOMIC VALUES OF BIRD WATCHING AT POINT PELEE NATIONAL PARK, ONTARIO

by

GLEN TIMOTHY HVENEGAARD

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF SCIENCE

IN

WILDLAND RECREATION

DEPARTMENT OF FOREST SCIENCE

EDMONTON, ALBERTA

SPRING, 1989

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ABSTRACT

Recent increases in the popularity of bird watching across North America indicate significant economic benefits from the sport, in terms of value and expenditures. Point Pelee National Park, Ontario, one of the most desirable bird watching locations in the world for the spring passerine migration, drew over 57,000 birding gate visits in May, 1987, involving nearly 17,000 birders. A University of Alberta research team interviewed 603 randomly-selected bird watchers to collect data on travel and equipment expenditures, willingness to pay for their experience (consumer surplus), and socio-economic and recreational characteristics. An exploratory survey examined other non-use values associated with bird watching.

Estimated consumer surplus or willingness to pay (economic efficiency value) for birding at Point Pelee amounted to $4.1 million in May, 1987 (daily average of $76/birder). Daily rates of value decreased with length of stay at Point Pelee, but increased with a birder's income level. Inheritance and existence values for birds most sought after by visiting bird watchers were substantial.

Total expenditures (economic impact value) resulting from bird watching trips to Point Pelee in May, 1987 amounted to $3.8 million, of which $2.1 million was spent in the local area of Leamington, Ontario. Major expenditure areas were travel (27%), food (26%), accommodation (23%), and equipment (13%). Birders spent, on average, $244/trip or $66/day of birding at Point Pelee. Daily expenditure rates increased with photographic involvement, distance travelled, income, and education, but decreased with length of stay at Point Pelee.

Bird watchers at Point Pelee had above-average educations (62% held bachelor's degrees) and household incomes (average 1986 gross household income of $57,175). The average age was 49 years. Fifty-one percent of the respondents were international visitors. Almost 41% of Pelee birders were photographers (11% were advanced). Average length of stay at Point Pelee was 3.4 days.

The rationale for economic valuation of wildlife recreation is presented, and theoretical implications and recommendations are presented and discussed.

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TABLE OF CONTENTS

Chapter Page

Abstract iv

Acknowledgements vi

List of Tables xii

List of Figures xv

I. INTRODUCTION 1

  A. Background 1

    Introduction 1

    Resource Allocation and Uses of Wildlife 2

    Bird Watching 4

      History of Bird Watching in North America . 4

      History of Birding at Point Pelee 6

      Reasons for Participation 6

  B. Study Rationale 8

    Importance of Bird Watching 8

    Importance and uses of study 9

  C. Study Purpose and Research Objectives 11

    Purpose of the Study 11

    Research Objectives 11

    Specific Questions to be Addressed 12

    Propositions 13

      1. Descriptive Propositions 14

      2. Correlative Propositions 14

  D. Definition of Terms 15

E. Study Area Description 17
    Point Pelee National Park 17
    Town of Leamington 20
F. Organization of the Thesis 20
II. THEORETICAL FRAMEWORK AND TECHNIQUES 22
A. Economic Theory 22
B. Utility 25
C. Worth of Recreational Wildlife Use 27
    Demand 27
    Economic Values 32
C. Supply of Wildlife Recreation Opportunities 36
D. Nature of the Wildlife Resource 39
E. Value Measurement Techniques 41
    Contingent Valuation Method 41
    Travel Cost Method 44
    Choice of Methods 46
F. Use of Economic Values 47
G. Economics of Bird Watching 48
    Economic Impact Studies 49
    Economic Efficiency Studies 51
III. RESEARCH METHODOLOGY 54
A. Survey Population 54
B. Interview Questionnaire Methodology 55
    The Questionnaire 56
        Development 56
        Questionnaire Content 57

Types of Questions 58

C. Survey Sampling Techniques 59

Necessary considerations 59

Sample Size 60

Survey Frame 60

Sample Composition 62

Sample Selection 63

Weighting Procedures 66

D. Data Processing and Analysis 66

E. Restrictions of the Study 68

Delimitations 68

Assumptions 69

F. Exploratory Survey of other Economic Values 70

IV. DATA RESULTS AND DISCUSSION 72

A. Descriptive profile of birders 72

Socio-economic characteristics 72

Recreational characteristics 84

B. Economic Analysis of Birding at Point Pelee 88

Expenditures by May Birders 89

Net Economic Value of Birding at Point Pelee .. 96

Extrapolations of Value and Expenditures for 1987 99

C. Correlative Propositions 100

Economic Value 102

Travel and Equipment Expenditures 108

Photographer Type 124

Distance Travelled 130
Length of Stay 133
D. Other Economic Values Associated with Bird Watching 137
E. Responses to Research Goals 140
V. CONCLUSIONS 142
A. Summary of Results 142
Socio-economic and Recreational Characteristics 142
Economic Analysis of Bird Watching at Point Pelee 143
B. Comparative Value of Outdoor Recreation Activities 144
C. Theoretical Implications 146
D. Management and Planning Recommendations 149
E. Needs for Further Research 150
VI. BIBLIOGRAPHY 152

APPENDIX I - Copy of Main Survey Questionnaire.......... 163
APPENDIX II - Codebook for Main Survey Questionnaire ... 169
APPENDIX III - Copy of Exploratory Survey Questionnaire 182
APPENDIX IV - Codebook of Exploratory Survey Questionnaire 185
APPENDIX V - Additional Data Tables For Reference 190

LIST OF TABLES

Table	Description	Page
III-1	Location of Interviews at Point Pelee National Park - May, 1987	61
III-2	Sampling Stratification and Sample Sizes During Study Period	64
IV-1	Socio-demographic Characteristics of Bird Watchers From Comparable Studies	74
IV-2	Distribution of PPNP Bird Watchers (May, 1987) and All Canadians (1981) by Occupational Category	81
IV-3	Locations of Origin for Bird Watchers at PPNP - May, 1987	82
IV-4	Common Cities of Origin for Bird Watchers at PPNP - May, 1987	83
IV-5	Travel Distances for PPNP Bird Watchers - May, 1987 (excluding overseas visitors)	83
IV-6	Expenditures by Bird Watchers at PPNP - May, 1987	90
IV-7	Breakdown of Travel Expenditures for Bird Watchers at PPNP - May, 1987	94
IV-8	Breakdown of Food Expenditures for Bird Watchers at PPNP - May, 1987	94
IV-9	Breakdown of Accommodation Expenditures for Bird Watchers at PPNP - May, 1987	94
IV-10	Equipment Expenditures by Birders at PPNP - May, 1987	95
IV-11	Estimates of Economic Value and Expenditures Resulting from Bird Watching at PPNP in 1987 .	101
IV-12	Categories of Variables Used in Correlative Analyses	103
IV-13	Annual Equipment Expenditures Compared with Level of Birding Participation	115

IV-14 Comparison of Birding Expenditures with Country of Origin 119

IV-15 Comparison of Birding Expenditures with Income Levels 121

IV-16 Comparison of Birding Expenditures with Educational Levels 121

IV-17 Comparison of Participation in Photography with Birding Experience 126

IV-18 Comparison of Photography Type with Level of Birding Participation 126

IV-19 Comparison of Photography Type with Age of Birders 128

IV-20 Comparison of Participation in Photography with Sex of Bird Watchers 128

IV-21 Comparison of Photography Type with Sex of Birders 129

IV-22 Comparison of Length of Stay with Experience Level 134

IV-23 Comparison of Length of Stay with Participation Level 134

IV-24 Comparison of Length of Stay with Distance Travelled 136

V-1 Value Estimates for Various Outdoor Recreation Activities 145

A5-1 Comparison of Value and Expenditures Per Day with Length of Stay 191

A5-2 Comparison of Value Per Day with Income Levels 191

A5-3 Comparison of Expenditures for Photographers and Non-photographers 191

A5-4 Comparison of Expenditures with Type of Photographer 192

A5-5 Comparison of Annual Equipment Expenditures and Birding Experience 192

A5-6 Comparison of Expenditures and Familiarity with PPNP 192

A5-7 Comparison of Expenditures and Distance Travelled 193

A5-8 Comparison of Travel Costs with Age Group of Bird Watchers 193

A5-9 Comparison of Participation in Photography with Country of Origin 194

A5-10 Comparison of Distance Travelled with Experience Level 194

A5-11 Comparison of Distance Travelled with Age Group 194

LIST OF FIGURES

Figure	Description	Page
I-1	Location of Point Pelee National Park (source: Parks Canada 1982)	18
II-1	Demand and Supply Curves and Price Equilibrium	29
II-2	Concept of Consumer Surplus	35
IV-1	Distribution of PPNP Bird Watchers (May, 1987) and All Canadians (1986) by Age Group	75
IV-2	Educational Levels of Bird Watchers at PPNP - May, 1987	77
IV-3	Comparison of Educational Levels between PPNP Bird Watchers and All Canadians	77
IV-4	Household Income of Bird Watchers at PPNP - May, 1987	79
IV-5	Bird Watcher Gate Visitation at PPNP in 1987 .	87
IV-6	Expenditure Areas for Bird Watchers Visiting PPNP - May, 1987	91
IV-7	Total and Local Expenditures by Bird Watchers Visiting PPNP - May, 1987	92
IV-8	Annual Equipment Expenditures by Bird Watchers Visiting PPNP	97
IV-9	Equipment Expenditures by Bird Watchers Visiting PPNP - May, 1987	98
IV-10	Relationship Between Daily Economic Values (Impact and Efficiency) and Length of Stay ...	106
IV-11	Trip and Equipment Expenditures for Photographers and Non-photographers	109
IV-12	Relationship Between Birding Expenditures and Photographer Type	111
IV-13	Relationship Between Rate of Birding Equipment Purchases and Experience Level	113
IV-14	Relationship Between Birding Expenditure Rates and Distance Travelled.......................	117

IV-15 Birding Expenditures for Various Age Groups .. 123

I. INTRODUCTION

A. Background

Introduction

The importance of wildlife in our society is illustrated by its numerous and varied uses. Nonconsumptive uses of wildlife, long evident in human history, are growing in popularity, and the associated economic values are only beginning to be recognized. (Filion et al. 1983, 1985; Jacquemot et al. 1986). Measurement of these values, which represent the net benefit to society, are necessary to provide a reasonable rationale for wildlife conservation, efficient natural resource allocation, and park and protected area establishment, in light of diminishing wildlife habitat.

The combination of increased demand for wildlife and scarce wildlife habitat generates economic value. However, in the past, the values of wildlife recreational use have been difficult to measure and compare with alternative land uses. These values must be estimated and made available to the appropriate decision-makers because, traditionally, the demand for wildlife recreational use has not been registered, except in the political arena.

Bird watching, as a specific and representative subset of nonconsumptive wildlife uses, is now the fastest-growing outdoor sport in North America (Scofield 1978, Harrison 1979, Butler 1984), and results in significant economic benefits and impacts. In few other places is this more apparent than in Point Pelee National Park, which was one of the first national parks in Canada created to preserve the natural environment (Parks Canada 1975), and where tourists come from all around the world to observe wildlife. Currently, the spring bird migration is the dominant wildlife event at Point Pelee, attracting thousands of bird watchers, a majority of which are international visitors.

This thesis will investigate the nature of this event by outlining the economic values associated with bird watching at Point Pelee, as a case study, in order to unveil the sport's net benefit to society, which has been previously unmeasured. At the same time, the socio-economic and recreational characteristics, and associated expenditures of bird watchers will be examined.

Resource Allocation and Uses of Wildlife

Historically, natural resource allocation efforts have focused on commodities for which suitable markets exist. The interaction between demand and supply of natural resources provides an efficient communication path to resource allocators. For example, logging companies have been successful in acquiring land because the harvestable resource has a derived market demand which can be used to obtain a resource value. On the other hand, most wildlife and wildlife recreational uses, as public goods, are generally nearly free to all Canadians, with only a few fragmentary markets in existence. It would be incorrect, however, to describe wildlife as valueless or not contributing to net benefits of society.

Participants in wildlife recreation can be categorized broadly into two groups which are not mutually exclusive: 1) consumptive users - hunters and fishermen; and 2) nonconsumptive users - bird watchers, wildlife observers, and wildlife photographers. The focus of this study is on nonconsumptive wildlife use. There is an increased awareness of the need to manage wildlife species valued by nonconsumptive users because of diminishing wildlife habitat and a shift in wildlife uses. This shift includes a general decline in hunting participation, and large increases in nonconsumptive wildlife use, such as bird watching (More 1979). For example, in 1981, 66.8% of Canadians (Filion et al. 1983), and in 1980, 54.9% of Americans (Shaw and Mangun 1984) participated in some nonconsumptive wildlife activity, whereas only 9.8% went on hunting trips (Filion et al. 1983). This gap has been projected to widen in coming years (Butler 1984).

Thus, the demand for, and value of, nonconsumptive uses of wildlife is growing, and the extent of participation is now being recognized. Recent studies examining the profiles and impacts of bird watchers have led to a greater understanding of the group and have shown that the sport of bird watching contributes to the net benefit of society. The primary purpose of this study is to determine the net economic value of birding, and of a birding experience, at Point Pelee National Park, Ontario. With a greater knowledge of birders and their associated economic values, natural resource allocation will more truly reflect the importance of this nonconsumptive wildlife user group.

Bird Watching

History of Bird Watching in North America

The long history of bird watching is characterized by diverse individuals with special talents, interests, and personalities. More complete descriptions of this history can be found in Kastner (1986) and Scofield (1978). Of course, prehistoric paintings and carvings of birds remind us that early Indians were actually the first bird watchers in North America. Fenton (1988) divided the more recent history of bird watching into four distinct time periods.

During the first period (1600-1857), the influx of European settlers to North America brought many wildlife artists to record and paint the birdlife. These included Mark Catesby, William Bartram, Alexander Wilson, John James Audubon, Thomas Nuttall, and John Townsend. Publications by these early ornithologists spread the fame of North

America's birdlife around the world.

The second period (1858-1885) witnessed the scientific documentation of birds, the establishment of bird organizations, and the publication of several bird identification books. Led by notables like Spencer Fullerton Baird, Thomas Brewer, Henry Henshaw, William Brewster, and Elliot Coues, and organizations like the Nuttall Ornithological Club, the discipline of bird watching was firmly established.

The third period (1886-1933) saw bird watching become popularized and birds receive protection under the primary influence of the Audubon Society. Frank Chapman established the first Christmas Bird Count in 1900 and founded "Bird-Lore," a magazine for bird appreciation. Theodore Roosevelt, as president of the United States and an active birder, designated many bird sanctuaries across the country. The Audubon Society campaigned for the Lacey Act of 1900, which provided national protection for birds.

The final period (1934-present) was initiated by Roger Tory Peterson's "A Field Guide to the Birds," which made birds easier to learn and identify, and enabled the popularity of bird watching to grow by leaps and bounds.

Today, depending on the definition, the percentage of bird watchers in North America ranges from 3% to 60% of the population (Fazio and Belli 1977, Kellert 1985). North America ranks second in the world in bird watching, in terms of percentage of participation, behind England, and ahead of Australia and other European countries (Scofield 1978).

History of Birding at Point Pelee

The significance of Point Pelee's birding qualities were first alluded to by William Brodie in 1870. In 1882, William Saunders first experienced Point Pelee, and later introduced his ornithological friends to the area (Cranmer-Byng 1984). This led to the establishment of the Great Lakes Ornithological Club which served to document bird migrations and circulate knowledge of the Point's avifauna through various publications. Besides Brodie and Saunders, some of the prominent early members of the club included Percy Taverner, Brad Swales, James Fleming, Lynds Jones, Burt Gardiner (Cranmer-Byng 1985).

The movement to protect Point Pelee National Park (designated in 1918) was spearheaded by Jack Miner, president of the South Essex Conservation Organization. With road and facility development in the 1920's, more visitors came to Point Pelee, many of them bird watchers (Battin and Nelson 1979). Participation in the sport has grown steadily, accelerating the greatest from 1950 to the present.

Reasons for Participation

Present-day birders participate in the sport for a variety of reasons which influence subsequent activities such as intensity and participatory mode. The most-often cited reasons for bird watching are the beauty of birds, a personal fascination with birds, and a desire to be close to nature (Kellert 1980). Other less-often cited reasons illustrate how recreational motivation affects intensity and participation. For example, those birders who desire to identify as many birds as possible will watch birds many hours each day, either alone or in small groups. Birders who use the sport to be with family or friends are not as intense and often travel in larger groups (Butler and Fenton 1988).

The range of motivations is also illustrated by the variety of sub-typologies of bird watchers. They range from listers, affective watchers, advanced watchers, family bird watchers, courtship bird watchers, photographers, and social bird watchers (Butler and Fenton 1987). In this study, the only attempt to classify bird watchers is through photographer type. Applegate and Clark (1987) found that advanced birders (with more specific preferences for bird sightings) reported lower satisfaction levels than less sophisticated birders. Thus, bird watchers are not a homogeneous group and require a range of management techniques to maximize satisfactions and net benefits, but as yet, are still poorly understood (Kellert 1980, Butler and Fenton 1987).

B. Study Rationale

Importance of Bird Watching

Bird watching involves approximately 20 to 30 million people annually in North America (More 1979, Lyons 1982, Shaw and Mangun 1984, Kellert 1985, Jacquemot and Filion 1987) and, as previously mentioned, is growing rapidly. In Canada alone, over 13% of the population undertook special trips in 1981 to observe, photograph, or study birds (Jacquemot and Filion 1987). Economic expenditures resulting from bird watching in North America are estimated to be in excess of $25 billion each year (Butler 1984, Hvenegaard 1989). Although some researchers have focused on the economic values of other general nonconsumptive activities (Myres 1968, Filion et al. 1985), relatively few have focused quantitatively on the economic efficiency or impact values of bird watching itself.

Researchers have stressed the importance of future examination of bird watching's economic contributions (DeGraaf and Payne 1975, Kellert 1985), and some attempts have been made. For example, bird feeding, distinct from bird watching, has long been recognized as a significant industry (George et al. 1981), but the recreational value has not been specifically investigated. In a recent study at Point Pelee National Park, Butler and Fenton (1988) found that a significant economic contribution from birding photographers was apparent. At Point Pelee, during May, 1985, some 1.7 million photographs were taken, involving a total expenditure of $710,000 for film and development alone.

Bird watching at Point Pelee has become an international event, and the park is regarded as one of the best birding destinations in North America, especially during the spring bird migration (Harrison 1976, Hince 1986, Greij 1987, Berton 1988). Each May, corresponding with the northward migration of birds, over 57,000 gate visits by birders are recorded at Point Pelee (involving nearly 17,000 individual birders). These participation rates at Point Pelee are projected to increase as interest in the sport and the park expands.

Importance and Uses of the Study

This study will assess the birding activities, expenditure patterns, and economic values of bird watchers at Point Pelee. The results can prove valuable in the formulation of future management and planning decisions. It will raise the profile of bird watchers and their needs, giving credibility to their demands for more efficient allocation of natural resources and management efforts. In summary, it is important to understand the scope of these economic contributions and values for the following reasons:

1. Since nonconsumptive wildlife users (including bird

watchers) have long been a quandary to wildlife agencies, the economic values have been underrated in the past.

2. The sport of bird watching can be equated with the rising values of ecotourism (tourism focused on appreciative uses of natural ecosystems), which are recognized as enormous in North America and around the world.
3. The breadth and magnitudes of various economic values associated with bird watching are not well understood.
4. While the significance of a birding location is recognized on-site, the importance is not often documented or measured in units comparable to other recreation or resource uses.
5. The results of this investigation will illustrate the range and magnitudes of economic benefits attainable by promoting bird watching destinations. Other communities and businesses, located in the proximity of parks, sanctuaries, and wildlife refuges, will recognize the possibilities for improving overall net benefits and local impacts.
6. Point Pelee National Park offers unique opportunities to study the economic values of bird watching since the bird watchers are relatively isolated (geographically and temporally) from other users, there are few intervening attractions, and the nearby host community

of Leamington is both a transfer and base point for visiting bird watchers.

C. Study Purpose and Research Objectives

Purpose of the Study

The primary purpose of this research study is to quantify the economic values bird watching at Point Pelee National Park, Ontario, in a manner transferable to other bird watching locations throughout North America and the world. While this study is not intended to assign economic measures to every potential benefit from bird watching, estimates of recreational value, comparable to other recreational activities, are presented.

Research Objectives

Specific research objectives of the research study are the following:

1. To identify and isolate the relevant economic contributions and values of bird watchers at Point Pelee National Park, and the associated socio-economic and recreational characteristics of bird watchers.
2. To determine, in concrete terms, gross expenditures and net value of a bird watching experience at Point Pelee National Park.
3. To analyze the associations and interrelationships

among economic values, expenditures, and socio-economic and recreational characteristics of bird watchers at Point Pelee National Park.

4. To expand the assessment of net benefits beyond expenditures in an effort to properly estimate the net economic value of a bird watching experience.
5. To assemble a methodology for the measurement of actual and potential benefits, in terms of economic and efficiency values, of a bird watching experience, which will be useful to other locations utilized by birders or nonconsumptive wildlife users.

Specific Questions to be Addressed

Specific questions that arise from these general research objectives include the following:

1. What are the socio-economic and recreational characteristics of bird watchers that affect their expenditures and values?
2. What are the important expenditure areas for bird watchers as they prepare for their birding trip to Point Pelee, travel to and from Point Pelee, and stay at Point Pelee?
3. How does previous bird watching experience, participation rate, and familiarity with Point Pelee affect value and expenditures?
4. What significant relationships exist among socio-

economic characteristics, recreational characteristics, values, and expenditures of bird watchers?

5. What is the net economic value of a bird watching experience, considering variables such as expenditures and enjoyment value?
6. What are the magnitudes of other non-use values placed on birds and the bird watching experience at Point Pelee?

Propositions

To accomplish the research objectives, several study propositions were formulated to examine the extent of the economic values, expenditure patterns, and strength of associations among economic values, expenditures, socio-economic characteristics, and recreational characteristics. These propositions allow for clear answers to specific statements which are based on economic theory and past research.

The descriptive propositions are outlined to test the research objectives concerning the extent of economic value and expenditures associated with bird watching at Point Pelee. The correlative propositions are categorized by various dependent variables, beginning with economic value and expenditure patterns. Other dependent variables are also investigated to gain a better understanding of birders and how a chain of influence may affect various characteristics important to economic analyses. The major propositions to be investigated are the following:

1. Descriptive Propositions:

A. Total economic value resulting from bird watching trips to Point Pelee represents a significant contribution to society.

B. Total expenditures resulting from bird watching trips to Point Pelee represent significant economic impacts.

C. Travel and equipment expenditures resulting from bird watching trips to Point Pelee represent significant economic impacts.

D. Socio-economic characteristics of bird watchers are unique, compared to those of the average Canadian.

E. Other economic values associated with bird watching represent a significant portion of the total value of a bird watching experience.

2. Correlative Propositions:

A. Economic value of bird watching is correlated with various socio-economic and recreational characteristics.

B. Travel and equipment expenditures of bird watchers are correlated with various socio-economic and recreational characteristics.

C. Photographer type is a significant variable which affects the chain of influence on economic value and expenditure patterns of bird watchers, and is correlated with various socio-economic and recreational characteristics.

D. Distance travelled is a significant variable which affects the chain of influence on economic value and expenditure patterns of bird watchers, and is correlated with various socio-economic and recreational characteristics.

E. Length of Stay is a significant variable which affects the chain of influence on economic value and expenditure patterns of bird watchers, and is correlated with various socio-economic and recreational characteristics.

The latter three propositions suggest further investigation of photographer type, distance travelled, and length of stay as important variables which affect economic value and expenditures. Analyses will examine associations between each dependent variable and a number of independent variables (where appropriate) including photographer type, birding experience, participation rate, familiarity with PPNP, length of stay, distance travelled, country of origin, size of residence, income, education, age, and sex.

D. Definition of Terms

The following are definitions to be used for some of the more important and most often used terms found throughout this document.

1. Bird Watching / Birding: A recreational activity involving the observation or study of birds in their natural habitat, most often with the use of binoculars.

2. Bird Watcher / Birder: A park visitor whose primary activity at a specific location (ie. Point Pelee National Park) is bird watching. Authors have differentiated between the two often-used terms "bird watcher" and "birder" (Kastner 1986), but no distinction will be made in this thesis. More specific definitions do exist which classify bird watchers differently. For example, Kellert (1980) defines "casual" bird watchers as those who have bird watched within the past two years and "committed" bird watchers as those who can also identify at least 40 species of birds. Other commonly used terms include "twitchers," "listers," and others listed as separate sub-typologies of bird watchers.

3. Recreational Consumptive Wildlife Uses: Wildlife recreation activities which are generally resource extractive (Fazio and Belli 1977). These activities include hunting, fishing, and recreational trapping.

4. Recreational Nonconsumptive Wildlife Uses: Recreational uses of wildlife which do not result in intentional removal of an animal from its environment by the participant (Kruckenberg 1988). Richards (1980) refers to these uses as human benefits derived from wildlife while not taking their lives for sustenance or pleasure. These

activities include bird watching, wildlife observation, wildlife photography, nature walks and study, and bird feeding (More 1979).

5. Value: The expressed relative importance or worth of an object to an individual or group, in a given context (Brown 1984).

6. Economic Impact Values: Values associated with expenditures by recreationists within a geographic area (Sorg and Loomis 1986).

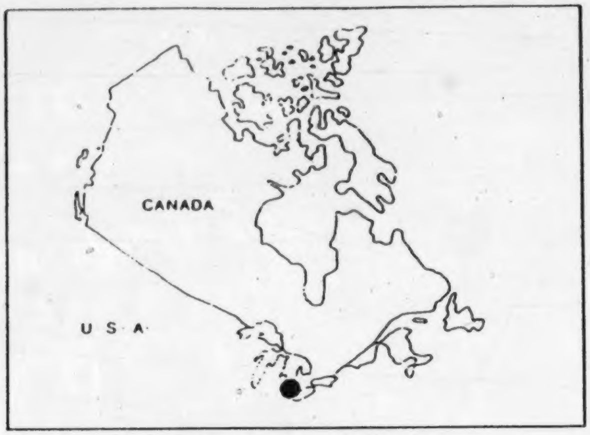
7. Economic Efficiency Values: Values generated with net gains to society resulting from alternative resource uses, often measured by willingness to pay over and above current expenditures (Sorg and Loomis 1986). This is called consumer surplus or net economic value, and includes both market and non-market resource use components, the latter of which are not always measurable.

E. Study Area Description

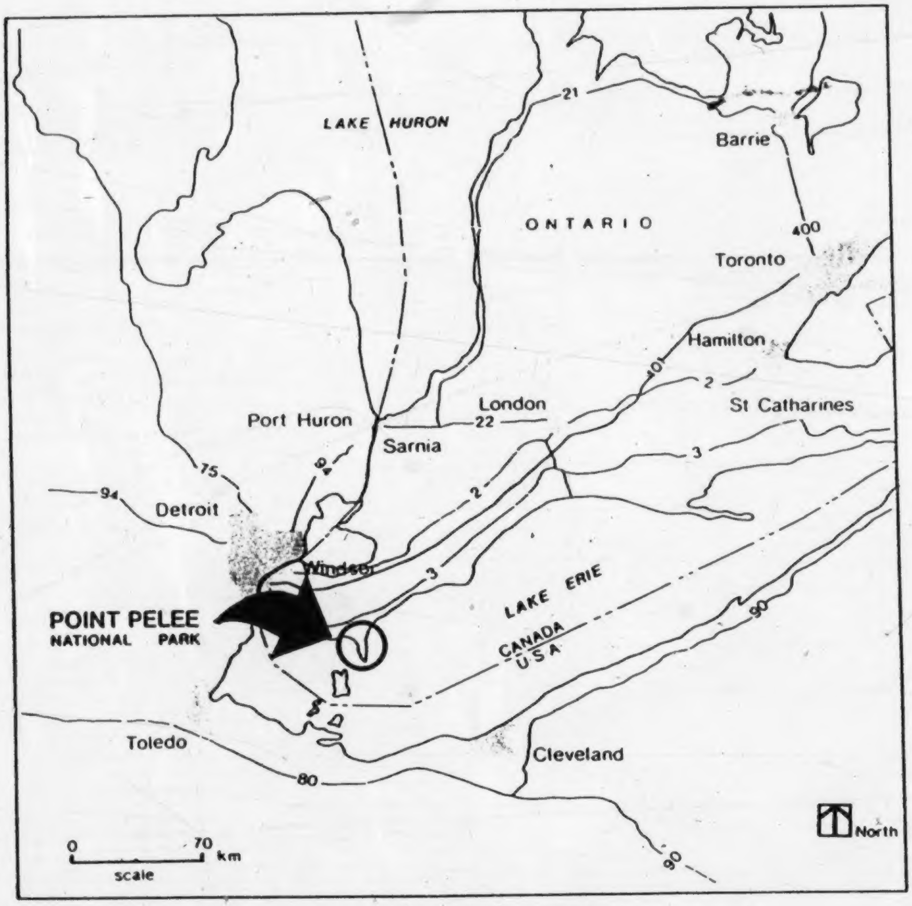
Point Pelee National Park

Point Pelee National Park is located in the extreme southern corner of Ontario, on the northwestern shores of Lake Erie. It is approximately 80 km southwest of the Windsor-Detroit metropolitan area, and only 9 km south of the town of Leamington (Fig. I-1).

Point Pelee contains a sandspit formation which extends



POINT PELEE NATIONAL PARK IN ITS CANADIAN CONTEXT


LAKE HURON
21
Barrie
ONTARIO
400
Toronto
Hamilton
401
2
St Catharines
London
22
Port Huron
Sarnia
3
75
94
Detroit
2
Windsor
3
LAKE ERIE
POINT PELEE
NATIONAL PARK
CANADA
USA
90
Toledo
Cleveland
80
90
0
70
km
scale
North

POINT PELEE NATIONAL PARK IN ITS REGIONAL CONTEXT

Figure I.1 Location of Point Pelee National Park

south into Lake Erie, finally narrowing to a tip. This tip is the southernmost point in Canada, and is on the same latitude as northern California. Only 16 km^2 in size, the park contains a wide variety of habitats, including marshes, beaches, forests, and fields. The most significant of these is the rare Carolinean ecosystem, now reduced to a fraction of its original size in southern Ontario. This Carolinean forest contains a large number of plant and animal species found nowhere else in Canada. The range of habitats attracts a diversity of wildlife species. Over 347 bird species have been recorded at Point Pelee, many of which can be seen during the spring migration period. As well, a large number of species of mammals, reptiles, amphibians, and plants reside in the park.

The Point Pelee region has had a long and varied history of land uses, including farming, forestry, fishing, hunting, trapping, settlements, and recreation. By 1870, naturalists were realizing the value of Point Pelee as a significant location for bird observation and study. Point Pelee National Park was designated in 1918, becoming the ninth national park in Canada, and was the first to be created on the merits of its natural ecosystem. Participation in bird watching, as a wildlife recreation activity, has grown steadily since the early 1900's, accelerating the greatest from 1950 to the present. Today, approximately 88,000 birding gate visits are recorded at

Point Pelee each year, involving over 40,000 individual birders, most of whom visit during the spring season.

Point Pelee is strictly a day-use park, with many picnic areas and hiking trails. During the spring migration, the centrally-located visitor centre serves as the hub of birding activity and information, and the nearby town of Leamington (population of 12,000) serves as the hub of tourist services.

Town of Leamington

Leamington, located 9 km north of the park, receives most of the tourism benefits associated with bird watching. Service facilities such as restaurants, supermarkets, hotels, and camping areas are located in town or in close proximity. In addition, other birding attractions are located in the vicinity.

Once regarded as the "Tomato Capital of Canada" (referring to its fine tomato crops and Heinz factory), Leamington is becoming better known as the "birding capital of Canada," and, by emerging as a role model for other North American communities, has made significant gains in capitalizing on the economic possibilities from birders.

F. Organization of the Thesis

The components are presented in a traditional thesis research format. Chapter I introduces the study, and provides the necessary background. Chapter II examines the theoretical framework required to understand the scope and complexity of the research effort. Essential economic theory, as it pertains to the provision of park and wildlife resources, is presented. Chapter III outlines the research methodology used, including the survey design, sampling procedure, and limitations involved. Chapter IV presents the results from the investigation, emphasizes the practical and significant findings, applies them to the main purpose, and discusses their relationships. Finally, chapter V summarizes the results, suggests theoretical implications, provides recommendations for management and planning, and concludes with needs for further research.

II. THEORETICAL FRAMEWORK AND TECHNIQUES

Though research and interest in wildlife economics can be traced back to the early 1900's, it has emerged as a distinct field only in the past twenty to thirty years, thanks to both biologists and economists working together on a similar problem (Davis 1985). These scientists have combined the principles of two separate disciplines, and applied them to this interdisciplinary field. Early studies focused on expenditures of participants (economic impact) in wildlife activities (Myres 1968, Nobe and Gilbert 1970), and on the value of wild commodities (eg. fur and meat). However, the scope of the field has evolved to include the total economic value (economic efficiency) of wildlife recreation, in terms of a participant's willingness to pay (Davis 1985). A detailed economic analysis of wildlife recreation must then begin with a general discussion of basic economic theory.

A. Economic Theory

Economics is the study of the allocation of scarce resources among competing uses to satisfy the wants of society (Gregory 1972). Further, an economy is a system for organizing the production of goods and services, and their subsequent distribution among people. Specific to this thesis, the resources are scarce because they are useful, valuable, and limited in supply, either in an unmodified state (eg. birds and land) or after production (eg. national park with trails, visitor centres, etc.). Competing uses include all of the potential ways that resources can be utilized. The demands for natural resources are extremely varied, seemingly unlimited, and very dynamic. As discussed in chapter I, various uses can be made of these resources, and of these, wildlife recreation is growing quickly.

By combining natural resources with the inputs of labor and capital, various goods and services can be produced. These resulting goods, services, or primary resources (or some combination) are demanded by recreation users. Because natural resources are limited in supply, or scarce, they are considered valuable by those desiring their use, either for recreation or production.

Natural resources are scarce and cannot fully accommodate all of the potential uses, both within and outside the recreation sector. Even if the resources are renewable, they are subject to human restraint and sound management to ensure renewability at specified levels. Many birds are relatively scarce in today's world due to a number of factors, including habitat alteration and hunting (Diamond et al. 1987). This scarcity, combined with various uses, gives rise to value being placed on the bird resource. For example, a bird lister (a bird watcher whose goal is to observe new and/or rare birds), observing an endangered bird species for the first time, would place much higher value on that experience, compared to the observing of a common species such as a house sparrow or American robin. Since many birds are considered scarce in a general (ie. decreased relative abundance over time) or specific sense (ie. threatened, rare, or endangered species, based on actual populations), the number and quality of bird observation locations is limited. Broadly speaking, because these resources are scarce and potential uses almost unlimited, outputs must be circumscribed so that demand and supply can be specified and quantified (Driver 1985).

Therefore, these potential uses are competing for the same resources, and need to be evaluated in a consistent and comparable manner. Analyses of economic values can produce results for use in weighing alternative natural resource uses and in selecting the most efficient resource allocation pattern subject to society's equity constraints.

Arriving at these economic values is straightforward in many cases, but very complicated in others. A common measure of value must be generated, made available, and used to make proper decisions about competing land uses.

Most often in market situations, with specified resource ownership, value is derived from the price at which consumers are willing to buy and producers are willing to sell a certain quantity of a specified product. Prices can be used as a method of communication between producers and consumers to adjust quantities of goods and services produced and consumed.

The demand for resources is derived from the demand for the goods and services they produce. For example, the demand for wild birds and natural environments is derived from the demand for quality bird watching opportunities.

In order for an economic system to satisfy individual members of society, decisions must be made about resource allocation, based on economic benefits and values. The decisions serve to maximize the net benefit of resource use for society, which is commonly measured by Gross National Product. However, this measurement fails to account for the production and enjoyment of goods and services that do not pass through markets (Randall 1981), such as recreational wildlife use. Welfare economics emphasizes the optimal use of resources, so as to achieve maximum well-being for individuals in society. Economic well-being is reflected by individual utility, the subject of the next section.

B. Utility

The concept of utility is used by economists as a relative measure of satisfaction that a recreationist enjoys from consuming goods, services, and amenities. The utility level depends on goods and services bought in the marketplace, and on other non-market goods, for which there is no price-allocating device. Monetary measures of utility gained from these non-market goods are needed because their allocation is often inefficient in the political system.

Most market and non-market goods exhibit diminishing marginal utility. That is, as a person consumes more and more of a good in a given time period, the additional (or marginal) utility he/she obtains from each additional unit of the good diminishes. For example, the longer a birder stays at a given location, the marginal utility derived from each additional day of birding decreases.

Utility can be used to compare alternatives on the basis of relative rankings for each recreationist. A correct expression of utility useful for economic analyses is based on an individual's preferences and assumes that the individual: 1) has full information about alternative choices; 2) can consider all of the alternatives and develop consistent preference rankings; and 3) will, in the short-term, provide stable rankings (Randall 1981). Preferences and satisfactions may differ slightly, depending on the familiarity of a specific consumption decision, but this is the best method from which to develop economic analyses.

Satisfaction derived from recreational wildlife use is based on the social-psychological principles of motivations, expectations, needs, and attitudes. Motivations will direct and sustain an individual's behavior toward the attainment of a goal (Wortman and Loftus 1981), based on specific expectations. The hard lister, for example, is motivated to see as many bird species as possible, and gains satisfaction when his/her goal of checking a species off a list is completed. Recreationists must make preference decisions, among the many recreation alternatives, in order to reach a desired goal.

The needs of a bird watcher also influence subsequent motivations, preferences, and behavior. Desired outcomes will affect a bird watcher's method of interacting with the resource (eg. with a camera, through binoculars, with a tape recorder, etc.) and degree of specialization (Bryan 1979).

Finally, clusters of attitudes form social values which are the basis of economic values. A variety of social values, relating to nature, wildlands, and wildlife, have been identified by Kellert and Brown (1985), Rolston (1981, 1985), and Driver (1985), among which economic values are included. Thus, the full value of Point Pelee National Park includes more than just economic values. In the same manner, the total economic value of Point Pelee National Park is derived from more than just bird watching.

C. Worth of Recreational Wildlife Use

Demand

Utility from recreational wildlife uses is not readily observable, but is reflected strongly in demand for use. Demand is a schedule of willingness to pay and quantity of use for a specific resource. Generally, the quantity demanded of a wildlife resource is inversely proportional to the price of use for that resource, in a market situation (Fig. II-1). Thus, as price increases, the amount of use will typically decrease, and alternative recreation activities may be chosen. In wildlife recreation settings, the price includes travel costs, equipment expenditures, entrance fees, etc.

In a pure market situation, the interaction between supply and demand produces an equilibrium price where quantity demanded is equal to quantity supplied (Fig. II-1). Shifts in demand or supply result in new equilibrium prices and quantities appropriate for the economic situation.

The recreational use of natural resources, wildlife, or birds, in this case, involves a package of events. Clawson and Knetsch (1966) suggest that this recreational package involves anticipation, travel to, on-site activity, return travel, and recollection, with each phase potentially potential enjoyment and subsequent value.

Recreationists use resources for a variety of motives and in a variety of ways, many of which are conflicting. This increases the need for understanding the range of demands and values. Generally, these demands are increasing, as more and more people seek out wildlife recreation experiences.

The demand for wildlife recreation is affected by many

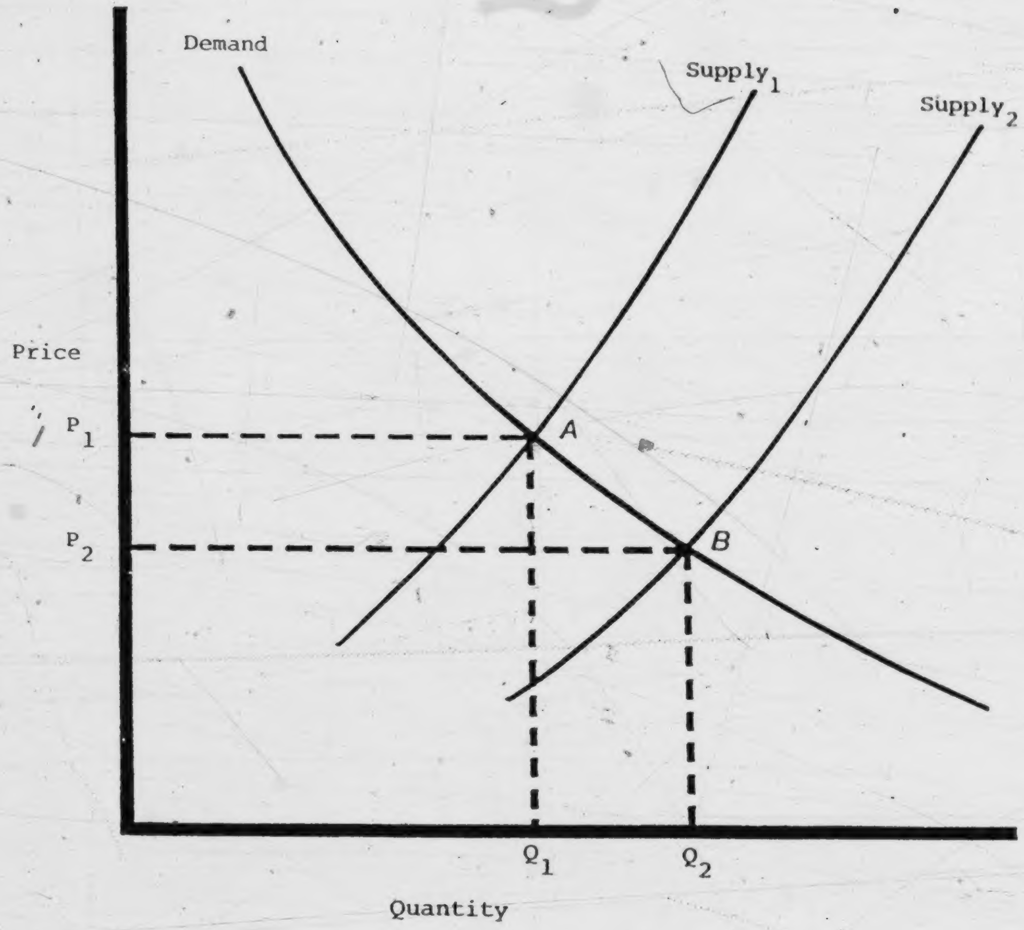


Figure II-1. Demand and Supply Curves and Price Equilibrium

factors, of which the major ones are here discussed. First, the population level and structure will affect the actual number of recreationists using a resource. Characteristics such as education and residential background can influence demand, in either direction, depending on the context. Third, the general increase in leisure time will overcome time constraints and enable recreationists to participate more freely in wildlife recreation. Similarly, an increase in income will allow recreationists to overcome cost constraints. Finally, knowledge of a change in availability of recreational resources can shift demand. For example, as birders become aware of an exceptional birding location (eg. through marketing), or if developments make a location more attractive, demand may be transferred from other locations or may capture some latent demand as additional people become involved.

Wildlife can be used in a great many ways, each of which contributes to the total demand for wildlife. These include, at the present time, recreation, aesthetic enjoyment, medicines, food, clothing, scientific research, biological control, ecological stability, pets, and ornamentation. Today, of course, recreation is one of the major uses of wildlife.

Recreationists can use wildlife either consumptively or nonconsumptively. Despite the nomenclature, all direct uses of wildlife are consumptive to some degree. Even bird watching, considered to be a nonconsumptive sport, impacts the birds directly, through flushing or raised heart rates, or indirectly, through vegetation damage from trampling. As mentioned earlier, the demand for wildlife recreation is shifting, with the demand for nonconsumptive forms increasing (More 1979). In fact, bird watchers, other wildlife watchers, and wildlife photographers are now majority users of wildlife (Butler 1984).

The growth in bird watching, and present participation rates, as has been detailed, reflects a strong and increasing level of demand for birds and, of course, for the land on which they are found. High expenditures associated with bird watching also suggest a substantial pseudo-price or willingness to pay for birding opportunities. These expressions of satisfaction or utility can be quantified by analyzing associated economic values.

To measure the intensities of values and preferences, one can measure the amount of money an individual is willing to pay to move from one situation to another (Just et al. 1982). For all economic situations, the two most common methods of measuring willingness to pay are compensating and equivalent variations. Compensating variation is the amount of compensation, paid or received, that would return an individual to his/her original welfare position, after an economic change. Equivalent variation is the amount of compensation, paid or received, that would bring the individual to his/her subsequent welfare position if the change did not occur (Randall 1981). Compensating variation restores the individual's original utility or welfare level and equivalent variation focuses on the welfare level after the suggested change.

These concepts are also related to observed quantities and prices on a demand curve when considering both utility and income (each individual has a finite income). The Marshallian demand curve is the demand curve derived by varying utility and holding income constant. On the other hand, the Hicksian compensated demand curve is the demand curve obtained by varying income and holding utility constant (Just et al. 1982). Each demand curve can provide different measures of demand which will affect subsequent benefits and prices.

Economic Values

Economists have long debated the taxonomy of economic resource values (Brookshire et al. 1978, Stoll and Johnson 1984, Bishop 1987, Randall 1987, Barrett 1988), but some consensus is being reached (Steinhoff et al. 1987). Estimating these values for specific recreational activities, such as bird watching, is necessary to make efficient decisions regarding alternative uses. The total value of wildlife resources can be divided into use values and non-use values.

Use values include both consumptive value and nonconsumptive value, and are generated when an individual uses the resource in the current time period (eg. birding at Point Pelee in 1987). This value is measured by consumer surplus, which is the benefit derived by consumers, above and beyond existing expenditures. Value resulting from vicarious consumption (eg. reading books, viewing films, etc.) may also be thought of as a use value, even though no direct contact with the resource occurs.

Non-use values are generated by possibilities for future uses of the resource, and are divided into option and existence values.

Option value is the willingness to pay to retain the possibility for future use, above expected consumer surplus (Bishop 1982, Brookshire et al. 1983, Walsh et al. 1984, Freeman 1985). Option price is the total value of willingness to pay and is calculated by adding option value and consumer surplus (Freeman 1985). Option value may be exhibited by a bird watcher's willingness to pay for the protection of Point Pelee National Park, and its resident and migratory birds, with the hopes of someday birding there. Quasi-option value is the value placed on the possibility of additional information arising regarding the impact of various resource uses (Randall 1987).

Existence value is the willingness to pay for the knowledge that a wildlife resource exists and will continue to exist. For example, a person would exhibit existence value if he contributed to Whooping Crane preservation, even though no personal use was expected. Randall (1987) describes how existence values can be generated by three distinct motives, or forms of altruism:

1) interpersonal altruism: value from others' use;
2) intergenerational altruism: value from future generations' use (or inheritance value); and
3) intrinsic altruism: value from just knowing the resource is preserved.

Any person can possess any or all of these values, depending on his/her context. Both option and existence values depend highly on the extent of demand and supply uncertainty. For example, if house sparrows were to be preserved, instead of Whooping cranes, the values would be substantially lower because house sparrows are more certain to survive in today's context.

Representing a monetary value of utility or welfare, consumer surplus refers to the amount of benefit gained above any expenditures, or the area under the demand curve (Fig. II-2). This can also be referred to as net economic value or net willingness to pay (Sorg and Loomis 1984). Consumer surplus is the proper measurement of net benefit of a recreational activity on a particular site because this is what would be lost if the activity no longer occurred. Gross willingness to pay includes both economic expenditures

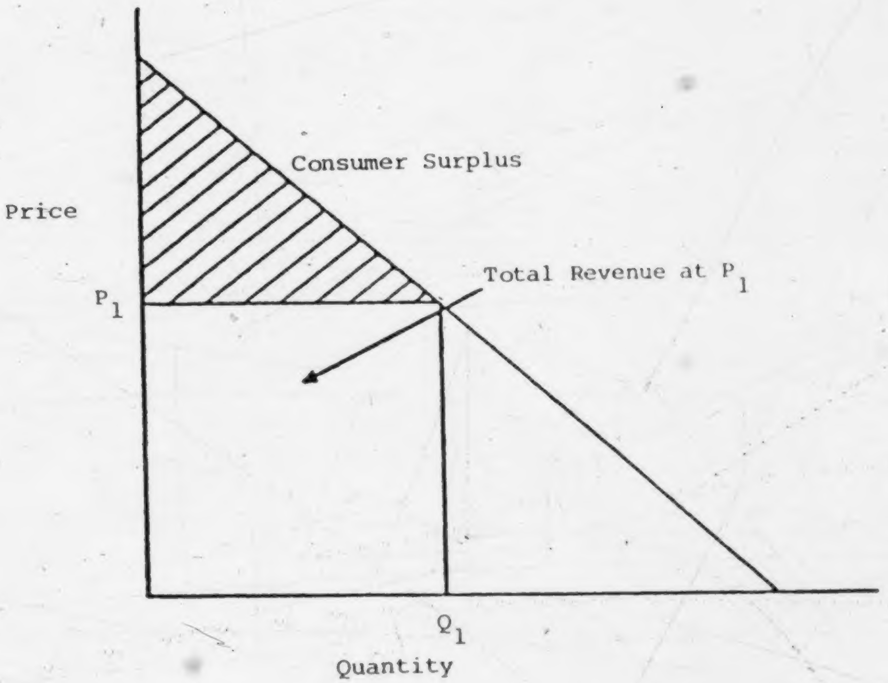


Figure II-2. Concept of Consumer Surplus

and consumer surplus. Utility maximization of individuals, subject to income and time constraints, is not readily observable and is therefore measured by consumer surplus (Just et al. 1982).

In addition to estimating willingness to pay for a resource use or change, researchers have also investigated the concept of willingness to accept compensation (or willingness to sell), which is more appropriate in some cases. Actual studies show that estimates of the latter are often substantially higher than those of the former, even though, theoretically, they should be closer in magnitude. The reasons for these differences are not well understood, but are being investigated (Adamowicz and Phillips 1983, Cummings et al. 1986).

C. Supply of Wildlife Recreation Opportunities

Supply is the schedule of provision, for sale by a producer, of quantities of goods and services at various prices. In a market situation, quantity of a product sold is proportional to the price that can be received. In most markets, supply can be influenced by technology, resource prices, taxes, prices of other goods, and future expectations.

Historically, opportunities for wildlife recreation were available in vast wildland areas across the continent. However, as natural environments and wildlife resources became scarce, the number and quality of wildlife recreation opportunities diminished. Thus, various agencies became involved in managing ecosystems and wildlife populations and providing wildlife recreation opportunities in Canada. These agencies include national and provincial park services, fish and wildlife departments, non-governmental organizations, and private individuals. In many other instances, wildlife is supplied incidentally, in conjunction with other management or land use practices.

These systems of provision are based on society's displayed desire to preserve wildlife populations and to enjoy wildlife-related recreation (Filion et al. 1983). For example, the Canadian Parks Service's objective is to protect for all time examples of Canada's natural and cultural heritage (Parks Canada 1983), while allowing for appropriate uses, whereas a local recreation area's goal may be solely to maximize opportunities for recreation through trails or boardwalks. However, Driver (1985) describes a problem that many wildlife management agencies are encountering. Since there is a lack of specification of the goods and services produced (eg. viewing opportunities or increased wildlife populations), the supply of outputs cannot be adequately estimated.

These supply efforts are often temporally reactive, rather than proactive. Only as a result of public outcry, political lobbying, or potential species extinctions are there initiatives by these wildlife agencies to create wildlife recreation opportunities or to preserve species. This is related to the public good aspect of wildlife, a topic dealt with in the next section.

Efforts of wildlife agencies to provide wildlife recreation opportunities have generally focused on the provision and management of game species for consumptive users. However, wildlife agencies are now becoming more concerned with entire ecosystems. Park agencies also provide wildlife recreation opportunities through trail construction and interpretation. Each agency involved with wildlife, though, is concerned with the management and protection of wildlife species.

Suppliers must understand users' demand preferences in order to satisfy the demand. For example, bird watchers naturally tend to travel where birds can be observed in the greatest numbers, and where a diversity of birds can be seen. Other things considered equal, some birders prefer a managed environment with many trails, interpretive events, and other birders. Other birders prefer an isolated experience with only wildlife protection being supplied. This range of interests and preferences supports the notion of Clark and Stankey's (1979) recreation opportunity spectrum (the provision of a diverse range of opportunities from which various experiences can be derived), particularly relating to the provision of wildlife recreation opportunities.

One of the difficulties in the supply and management of bird watching opportunities is how to ~~provide~~ avenues for public support of the spectrum of these initiatives. User fees, in the form of entrance fees or special use permits, are commonly used to charge users of a site for the site's continued operation (Harris and Driver 1987, Kaiser et al. 1987). Many others are in use or are being developed to efficiently supply wildlife recreation opportunities.

D. Nature of the Wildlife Resource

Wildlife in Canada is plagued or blessed, depending on the point of view, by its public ownership. By social choice, wildlife species are public goods through ownership by the citizens of Canada, held in trust by government, and managed generally by government agencies. As such, few markets exist for the supply and demand of wildlife resources, and little information is relayed to decision-makers about the resource's scarcity, price, or value. Individuals in society can express their desires to governments about these resources by voting and lobbying, but management efforts often suffer time lags. Another problem is that free-riders can benefit from public goods which are financially supported by others, but with no support of their own.

In pure market situations, goods must have nonattenuated property rights, or rights which are specified, exclusive, enforceable, and transferable (Randall 1981). However, among these, public goods, and wildlife in particular, do not have exclusive rights. Only after a hunter shoots and kills a deer, can he claim the deer to be his own. For nonconsumptive recreation, exclusive rights are almost never obtained. This is due, in part, to cultural and political traditions, and also to the migratory nature of wildlife, especially birds at Point Pelee, where the majority of species are migrants.

In a similar manner, bird resources are not divisible, as many market goods are. That is, even though one may be gaining utility from watching a bird, another person can gain an amount of satisfaction from watching the same bird, without affecting the utility of the first viewer.

In addition, since users cannot be excluded from observing a bird, there is no limit on the number of bird watchers. This may, however, lead to a problem of congestion, which can diminish satisfactions from a birding experience. For example, as the number of people watching a bird increases, individuals may lose utility because the experience is affected by their desire to feel less crowded.

These concepts of nonexclusivity and indivisibility make it very difficult to place prices on wildlife recreation opportunities, as commodities to be purchased. Some forms of wildlife recreation have now incorporated concepts of property rights and user fees, and have been successful (eg. hunting leases). However, it is becoming increasingly important to determine some sort of value for nonconsumptive wildlife recreation so that efficient resource allocation decisions can be made. Since government institutions are the wildlife custodians, they have been instrumental in discovering new methods of placing value on wildlife and wildlife recreation.

E. Value Measurement Techniques

In response to the challenge of measuring the values of wildlife and recreation resources, economists have developed several valuation techniques which are now commonly accepted in industrial, academic, and governmental circles. Each method attempts to measure, in some manner, how much an individual or population values a resource, based on willingness to pay or willingness to accept compensation. The most common and widely-accepted methods in use today are the Contingent Valuation Method (CVM) and the Travel Cost Method (TCM).

Contingent Valuation Method

A complete review of the CVM, sometimes referred to as the Direct or Survey method, is provided by Dwyer et al. (1977), McConnell (1985), and Cummings et al. (1986). Contingent Valuation relies on surveys to elicit users' valuation of their particular resource use activities (eg. bird watching), and to collect demographic or activity information which might be used as predictors for these valuations. The term contingent valuation is used because the questions directed toward users are "contingent" on there being a market for the good in question. The CVM has broad applicability for a variety of resources, including, but not limited to, wildlife, recreation, hazardous waste, visibility, and water pollution (McConnell 1985).

The CVM can be used to estimate value by asking resource users to state their willingness to pay for use of a particular resource or their willingness to accept compensation for not using the resource. Data collected by the CVM are analyzed by computing the mean of responses for a direct appraisal of the resource's value, or regression models can be fitted to the responses (with income, experience, expenses, length of stay, etc.) for predictive possibilities (Kaiser et al. 1987).

The CVM has several advantages over other methods. First, resource quality changes can be evaluated, multi-destination trips can be dealt with for recreation experiences, and congestion effects can be evaluated (Dwyer et al. 1977). As well, CVM questions can be designed to delineate consumptive, nonconsumptive, option, quasi-option, and existence values. The CVM can also separate wildlife values from overall activity values (eg. bird watching values from a general visit to Point Pelee) and the values need not be site-specific.

The CVM possesses several theoretical and practical shortcomings, however (Dwyer et al. 1977, Schulze et al. 1981, Rowe and Chestnut 1983, McConnell 1985). First, hypothetical bias may exist since individuals respond to survey questions with no actual expenditure or purchase, possibly resulting in inconsistent and inaccurate answers. However, research has shown that results from the CVM are both meaningful and comparable to other methods (Bishop et al. 1983, Cummings et al. 1986). Second, a respondent may answer a question in such a way that might influence policy in his/her favor, resulting in strategic bias. Third, starting point bias may occur in hypothetical markets using iterative bidding game formats (Boyle et al. 1985), since a final bid may be influenced by the starting bid provided by the interviewer. A vehicle bias may occur when answers vary with the vehicle used to convey a respondent's willingness to pay (eg. travel costs, taxes, entrance fees, etc.). An information bias may result because the amount of information provided to a respondent, formally or informally, will affect the response. Finally, as mentioned earlier, estimates of willingness to accept compensation are often higher than those for willingness to pay (Adamowicz 1983).

Travel Cost Method

Complete reviews of the TCM can be found in Dwyer et al. (1977), Rosenthal et al. (1984), McConnell (1985), and Kaiser et al. (1987). The TCM is based on the assumption that travel costs are a major factor in the consumption of recreation experiences, and that a recreationist's demand function can be traced out by observing the variation in an individual's travel costs. Since trip costs vary for people and for travel distances, this variation allows a demand function to be plotted.

To conceptually calculate aggregate benefits, the TCM is based on the notion that people in population zones surrounding a recreation site will take trips to the site as a function of their travel costs. Fewer people will visit from farther away because longer distances require larger travel costs. A relationship is formed where the number of trips per capita in each zone is a function of the travel costs for that zone, the population of that zone, some measure of substitute sites, and socio-economic characteristics of the users. By incrementally changing access costs to the site, the total number of visits can be determined. Site benefits are then calculated by multiplying the number of visits by each hypothetical site entrance fee (ie. consumer surplus), which is calculating the integral of the demand curve.

Before implementing a TCM to a particular recreational site, the situation must satisfy most of the following restrictive assumptions:

1. Individuals react to an increase in entry fees the same as they would to an increase in travel costs;
2. Recreation at a site is the main purpose of the trip;
3. All recreationists spend the same amount of time at the site;
4. Travel to the site results in no utility;
5. No substitute sites are available;
6. There is enough variation in travel costs to determine an adequate demand function; and
7. All demand for the site is satisfied (ie. no shortage of the good).

Despite the ease of implementation, the TCM is hampered by several issues which may decrease the accuracy of valuation estimates. The first, and possibly most troublesome issue, is how to value travel time. If there is disutility of travel time, a cost is incurred which must be included in the travel cost estimate. Some portion of the individual's wage rate (ranging from 25 to 100%) is most often used to estimate the opportunity cost of travel time. In some instances, however, travel time can provide utility to the traveller, further complicating the issue.

Secondly, the choice of functional form of travel cost models is subjective. Differences in functional form can substantially affect consumer surplus estimates. As well, different forms will imply different relationships between Hicksian and Marshallian surpluses. Nonetheless, most economics research supports the use of a semi-log form (McConnell 1985).

A third issue is one of substitute sites or quality variables. Rarely can a site be so geographically isolated that the role of substitutes be completely ignored, and the quality of a recreation site often determines its choice for use. Models have been developed to accommodate these factors, but they are still being improved.

Finally, other problems such as multi-purpose trips, impacts of consumer investment levels in recreation, heterogeneity within travel zones, and congestion are difficult to include in TCM benefit estimations. As well, the TCM is restrictive in that it is site-specific (ie. it can only evaluate one site or set of sites at a time).

Choice of Methods

Other methods that combine various components of the above models exist and are being evaluated, such as the Hedonic Price Model, Hedonic Travel Cost Model, the Household Production Function, and the Discrete Choice Model.

In choosing a specific method, one should consider the method's own advantages and disadvantages, potential uses and applications to a particular situation. For example, Kaiser et al. (1987) identify a rating scheme for a variety of valuation techniques, based on measures of an estimation of value, estimation of price, commensurability to other resource prices, availability of published studies, acceptance by academia, field office employability, and data availability and cost. Based on these and other concerns, Langford and Cocheba (1978) suggest that the only two techniques suitable for valuing wildlife recreation are the CVM and TCM because they have the ability to isolate the value of wildlife from other inputs, to accommodate the estimation of marginal values, and to facilitate the separation of collective-good benefits from private-good benefits.

This study utilizes the CVM for data analysis because of its flexible use and value delineation possibilities. The TCM and other methods have too many restrictive assumptions relevant to bird watching and the situation at Point Pelee National Park.

F. Use of Economic Values

The previously-discussed methods of estimating extra-market benefits provide valuable information which contributes to improved policy formation. The benefits derived from a birding location (or any development) can be included in an overall benefit-cost framework, commonly called a benefit-cost analysis (Randall 1981). The benefits derived from bird watching can be compared with the costs of providing quality bird watching opportunities at Point Pelee National Park. While expenditure data provide information on total and regional economic impacts, and recreation benefit data provide information on the scope of the activity, an overall benefit-cost analysis can be used to examine the net benefits to society. This can lead to more efficient decisions concerning resource and land use alternatives.

The benefit-cost analysis is useful to identify, organize, and evaluate the many issues involved in any resource allocation decision. However, Randall (1981), identifies problems that must be overcome in the process. These include effective pricing of all benefits and costs, choice of an appropriate social discount rate, and definition of the region of influence.

G. Economics of Bird Watching

Research studies placing dollar values on the sport of bird watching have generally been superficial and anecdotal in the past. Because of this lack of detailed information, researchers have called for more attention to be given to the economic expenditures and values associated with bird watching (DeGraaf and Payne 1975, Kellert 1985). Earlier economic impact studies are useful to describe the range of expenditures associated with bird watching, but later economic efficiency studies convey the true economic value of the sport.

Economic Impact Studies

Initially, research studies attempted to determine the economic value of birding, in terms of economic impact, by assessing the amount of money participants spend to engage in the sport (More 1979). This represents a minimum value of the economic importance of bird watching and must be less than or equal to total willingness to pay for the entire recreation experience including the wildlife component. In order to isolate the wildlife component, one must estimate the nonmarket values of wildlife and associated user fees.

Myres (1968), in a 1966 survey of Calgary Bird Club members, found that the average expenditure for equipment was $199 per person per year. As well, members spent an average of $168 per year on transportation for natural history field trips.

In 1974, DeGraaf and Payne (1975) estimated the total direct expenditures attributable to the enjoyment of nongame birds in the United States to be $500 million, much of which (95%) included expenditures on photographic equipment and services, birdseed, and binoculars. The remainder is attributed to expenditures on bird houses and feeders, memberships, and bird literature. ¶ No estimates were made for expenditures on transportation, food, lodging, or clothing used during bird watching expeditions. The researchers also predicted moderate increases in the economic importance of recreational activities associated with nongame birds (Payne and DeGraaf 1975).

Reflecting the value of bird watching, the wild bird feeding industry in the United States had a value estimated to be at least $90 million wholesale (or $180 million retail) in 1980 (George et al. 1981). More recently, bird feeders spend $517 million each year (New York Times 1986) on over 1.2 million tons of bird seed (Lipske 1986).

Expenditures on other birding equipment items illustrate the economic importance of the sport. Bird field guides, about 600,000 of which are sold annually, grossed $17.9 million in 1985 (New York Times 1986). Other major expenditure areas include binoculars, spotting scopes, cameras, records and tapes of bird sounds, computerized software for keeping bird lists, travel (bird tours now reach any corner of the world - Leo 1987), and rare bird alert membership dues (Chapman 1987). At Point Pelee National Park in May, 1985, photographs taken by bird watchers resulted in a total expenditure of $710,000 on film and development alone (Fenton 1988).

In Canada, over $1.4 billion was spent by participants on nonconsumptive bird-related activities in 1981 (Jacquemot and Filion 1987). Expenditures on all bird-related activities resulted in $4.0 billion in Canada's Gross

Business Production, $2.4 billion in Gross Domestic Product, and $1.4 billion in personal income from the 6,000 jobs created.

Economic Efficiency Studies

Researchers have realized that in measuring the total economic value of bird watching, they must estimate the nonmarket values of the sport (gross expenditures are only useful to describe the range of uses and local impacts).

Horvath (1974) first outlined the monetary values of wildlife enjoyment in a research study of the southeastern United States. He found that the average daily value received by participants (willingness to pay) from bird watching was $65.40 and the average daily value to give up by participants (willingness to accept compensation) was $81.00. Nonparticipants also assigned an average daily value of $27.23 to the enjoyment of birds (pseudo-option value). In southeastern Arizona, visitors to popular bird watching sites in 1977 placed an average daily value of $79 on their experiences (Richards 1980).

As mentioned earlier, Jacquemot and Filion (1987) found that $1.4 billion was spent on nonconsumptive bird-related activities in 1981, but an additional $167 million was the estimated value of enjoyment received, but not paid for (ie. use value). Filion et al. (1980) found that, of all participants in bird-related activities, 64% stated that the value received was worth a lot more than the actual cost (versus a little more, same, little less, or a lot less). These results indicate substantial use values beyond expenditures.

In Pembroke, Ontario, approximately 10,000 bird watchers visiting the famous swallow roost in 1986 received $35,400 in net benefits (ie. use value - Clark 1987). This estimate served as the basis for a benefit-cost analysis which led to the eventual protection of the site in the wake of other proposed development projects.

Specific estimates of other nonuse values associated with birds and bird watching are very limited. Stoll and Johnson (1984) estimated various values associated with the Whooping Cranes and the Aransas National Wildlife Refuge in Texas. Total use value for visitors to Aransas in 1982 was $213,340 (an average of $4.47 per person). Combined option price and existence value for Whooping Cranes by visitors was estimated to be $779,382 (or $16.33 per person). Combined option price and existence value for Whooping Cranes by the general United States population was estimated to range from $0.57 to 1.58 billion.

Thus, the necessary theory relevant to wildlife economics has been outlined and described, and the economic scope of bird watching has been summarized on a North American basis. This study will analyze the economic value of bird watching at Point Pelee National Park and discuss the associated profile of birders (ie. expenditures and characteristics) needed to understand them. Previously, economic values associated with nonconsumptive wildlife activities have been underestimated (Hay and McConnell 1979), and there has been relative neglect of the nonconsumptive uses of wildlife such as bird watching, wildlife watching, and wildlife photography. This study may lead to better estimates of the worth of bird watching, as an event, as measured and valued by birders.

III. RESEARCH METHODOLOGY

In order to meet the objectives put forth in Chapter I, a specific methodology was devised to collect the required socio-economic, recreational, and economic information. The study employed proven sampling, economic measurement, and statistical techniques to collect and analyze data in order to provide valid and reliable results.

A. Survey Population

The focus of the research study was on the bird watchers of Point Pelee National Park. Previous estimates have shown that a large majority of birding gate visits to Point Pelee occur in May, the primary birding season (Canadian Parks Service 1986). Thus, this research effort was also concentrated in May.

The park survey consisted of a random sample of all May visitors at least 16 years of age. This arbitrary age limit was chosen so that the sample only included respondents who had the ability to provide required economic data. Park visitors considered eligible for detailed interviews were those visitors whose primary purpose for being in the park was bird watching (an initial question was used to determine this purpose). In May, 1986, over 73% of visitors to Point Pelee National Park were birders. Other less common reasons for visiting the park were sightseeing, trailwalking, or picnicking (ADI Limited 1986). Park employees, family members, and contractors were not interviewed. Previous estimates by park staff suggested that the total population size during the month of May would be about 20,000 individual bird watchers.

B. Interview Questionnaire Methodology

A structured personal interview questionnaire was developed and used in this study. This approach was selected from various alternatives because of its appropriateness for effective application and efficient results. Other techniques considered for the study include self-administered mail questionnaires and telephone interviews.

There are several advantages in using the structured personal interview technique rather than techniques such as the mail questionnaire. Personal interviews permit greater depth and detail in the questionnaire and allow for probing and question clarification to obtain more complete data (Isaac and Michael 1981). In addition, personal contact establishes rapport with most respondents, resulting in more complete answers, and a greater response from potential survey respondents, especially when confidentiality is assured. Finally, interviewers are able to direct questions to, and limit answers from, the targeted respondent, without the bias of friends or family members.

A potential disadvantage of the structured personal interview questionnaire technique includes interviewer bias. This may result from an interviewer who tends to seek out answers that support his/her preconceived notions, or who is plagued with inconsistent or subjective questioning techniques (Isaac and Michael 1981). To mitigate this bias, the three interviewers were trained with proper interviewing procedures and made aware of where bias may occur and how it can be avoided. Regular briefing sessions were conducted to ensure consistency among interviewers. Other biases have already been described, as they relate to methods of economic valuation.

The Questionnaire

Development

Prior to the field season, the form of the final questionnaire was developed in the following manner. First, following a review of numerous literature references dealing with bird watching and the economic aspects of nonconsumptive wildlife recreation, important economic measurement principles were identified. Next, a preliminary instrument was designed to fulfil the desired research objectives. The instrument was then revised, in consultation with professionals and academics in the economics, recreation, and social science fields, to improve the types, wording, and arrangement of questions. In order to reveal any errors or problems (Chadwick et al. 1984), the questionnaire was pre-tested on May 1 and 2, 1987 . A final revision occurred to alleviate minor complications and to incorporate park management concerns about questionnaire length and wording. The final version of the questionnaire (Appendix I) includes several questions designed for and utilized by a corollary study on the regional and local economic impacts of bird watching at Point Pelee. The average interview length was ten minutes.

Questionnaire Content

The questionnaire was designed to elicit data on economic value from a respondent in a comfortable and logical manner. The four main information areas of concern, in order of appearance on the form, were birding characteristics, expenditure patterns, valuation of activity, and socio-economic characteristics.

By beginning with birding characteristics, each respondent was put at ease by asking questions of personal interest. Information obtained included purpose of trip, years of birding experience, rate of participation, familiarity with the park, origin, and trip length.

Next, respondents were asked to estimate birding trip expenditures on several categories such as travel, food, accommodation, film, entertainment, and souvenirs. Each respondent was prompted with all categories to encourage recollection of all expenditures related to the birding trip.

The valuation section was placed immediately after the expenditure questions because estimates of value were based on the previously-discussed expenditures. Potential vehicle bias was substantially reduced by using the relatively inoffensive vehicle of trip expenditures.

As part of the expenditures section, estimates of equipment expenditures in the past year were then obtained. Relevant to the simultaneous study on community aspects of bird watchers, several open-ended and evaluation questions were posed to respondents.

Finally, several socio-economic characteristics, including family size, occupation, income, education, and age, were obtained from respondents. These questions were placed near the end of the questionnaire so that rapport with, and confidence in the interviewer could first be established.

Types of Questions

The choice between open-ended and closed-ended questions to derive data was not a significant problem in the development of the instrument because a majority of the questions required concrete numerical answers. Open-ended questions were used for residential origin and occupation (where answers were later coded into manageable categories), and many of the expenditure and recreational questions (where answers were rounded to the nearest whole number). Open-ended questions are useful because they raise an issue and allow a respondent to answer in a way that he/she sees fit, not only as the preparer of the pre-coded answers sees fit. This allows for flexible and spontaneous answers which are later coded into manageable categories for data analysis.

Closed-ended questions are relatively easy to process and analyze, and provide a uniform frame of reference for respondents to use in determining answers (Weisberg and Bowen 1977). Closed-ended questions used in this study have defined and limited answers, so all of the possibilities were presented to the respondent.

C. Survey Sampling Technique

Necessary Considerations

As with other surveys, this research methodology was developed to address sampling concerns of accuracy and precision. More specifically, the sampling procedure sought to ensure:

1. A statistically significant sample size, for a given level of confidence and margin of error;
2. A representative sample of the population; and

3. A randomized sample selection.

By adequately dealing with these issues, as described in the following section, results from any research study will be reliable and precise, particularly with respect to inferences about the population.

Sample Size

A desired sample size was initially determined by the required sample size for estimating population proportions technique (or the sample size estimation for random sampling for discrete variables - Freese 1967). With a given level of confidence and margin of error, one can determine the statistically significant sample size required, based on a normal curve. In this instance, with a desired level of confidence of 95% and a desired precision level (or margin of error) of 4%, the maximum required sample size would be 600. To this end, an overall sample size of 603 was obtained.

Survey Frame

The research survey frame was randomly-selected bird watchers from the entire population (that is, bird watchers throughout the park). However, due to cost and time constraints, sampling was restricted to three locations in the park most frequented by bird watchers in May (Table III-1). In 1986, 86.3% of May visitors visited the Visitor

Table III-1. Location of Interviews at Point Pelee National Park, May, 1987

Location	Number of Interviews	Percent of Total
Visitor Centre-Tip	593	98.3
Marsh Boardwalk	6	1.0
Tilden Woods	4	0.7
Total	603	100.0

Centre-Tip area, 60.9% visited the Marsh Boardwalk, and 54.8% visited Tilden Woods (ADI Limited 1986). It is assumed that random samples at these three sampling locations will be representative of the entire population. The Visitor Centre-Tip sampling location is most frequented because of the availability of trails, key birding areas, and information services. This location was also a natural gathering area for bird watchers as they awaited public transportation, mingled around the visitor centre or Tip, or used the area to eat lunch. Actual sampling was concentrated in the Visitor Centre-Tip area due to logistical constraints.

Sample Composition

The sample taken from a population must be truly representative of that population. If some characteristics of the population are already known (ADI Limited 1986), The random sample can be stratified, if necessary, to increase precision of the research results. This study stratified weekend and weekday bird watchers because the Visitor Use and Characteristic Study (ADI Limited 1986) showed that these two groups differ for a number of recreational and economic characteristics.

In 1986, traffic volumes into Point Pelee National Park were approximately equal for total weekend and weekday use (visitation estimates are based on vehicle counts).

Assuming that the number of people per vehicle are approximately equal for both sub-populations, the sample sizes for each sub-population should also be equal.

Sampling efforts were directed toward the achievement of this goal (Table III-2), but due to manpower and time constraints, the goal was only partially fulfilled, leaving weekends slightly undersampled. However, because of significant sub-population differences, the results were later weighted to reflect the size of each sub-population for purposes of inference to the combined population.

Sample Selection

Bird watchers visit the park throughout the day (6 a.m. to 9 p.m.) and the actual timing for selection of respondents reflected that wide time range (7 a.m. to 7 p.m.). However, the interviewing process was concentrated during daily peak visitation hours (ie. 10 a.m. to 5 p.m.), as estimated by park staff. Sampling times generally avoided the most intensive hours of birding (6 a.m. to 8 a.m.), when birders are very intense and tend to constrict their social mode (Fenton 1988), and when they would be least likely to agree to an interview. By sampling during periods when the social mode of birders was expanded, the amount of inconvenience to them was greatly reduced.

Overall, an excellent response rate of 96.3% was achieved (n=603). Because of this high response rate, a

Table III-2. Sampling Stratification and Sample Sizes During Study Period

Stratum	Number of days	Population		Sample		Samples per day
		Size	% of Total	Size	% of Total	
Weekend Days	9	6482	46.5	234	38.8	26.0
Weekdays	15	7444	53.5	369	61.2	24.6
Total	24	13926	100.0	603	100.0	25.1

problem of non-response bias was assumed to be absent. The study period extended from May 1 to 24, 1987. Days of rest were taken by the study team on May 5 (half day), May 18 (half day), and May 21 (whole day).

At each of the three sampling locations, a number of gathering areas for bird watchers became apparent. These gathering areas, which were easily zoned and counted, included seats on the public transportation tram, picnic tables, and benches. Some sampling locations contained more than one type of gathering area. As each interviewer approached a designated gathering area, a random number was chosen to select the appropriate sampling site (ie. a table, bench, or seat) from which a respondent would be identified. Another random number was used to select the individual respondent. Whether choosing a sampling site or respondent, the interviewer counted clockwise from the approaching direction, and the sampling site or respondent corresponding to the random number was selected.

By selecting an individual respondent, rather than a group of respondents, potential group representative bias, as identified by Holland et al. (1986) and Stewart and Carpenter (1988), was avoided.

If a respondent was under 16 years of age, did not identify birding as his/her primary purpose, or chose not to participate in the interview, he/she was thanked and the interview was ended.

Weighting Procedures

Because weekend and weekday expenditure responses differed significantly throughout the study period, a weighting procedure was employed to ensure accurate expenditure estimates for the population. Each stratified sample (ie. weekend and weekday birders) was weighted according to the size of its respective sub-population so that population estimates were representative of the sample. As well, expenditure data were summarized for the entire month of May (a convenient unit of time).

D. Data Processing and Analysis

Questionnaire data were primarily pre-coded or required numerical responses, allowing for easy data entry. However, responses for the two open-ended questions required coding. First, residential origins were coded by country, by province or state, and by regional zones surrounding Point Pelee National Park (zones allowed for subsequent economic analyses dealing with travel distances). Second, occupations were coded according to the Standard Occupation Classification (Statistics Canada 1981) and grouped further into useable categories according to Pineo et al. (1977) and Pineo (1985). A codebook was developed to detail and summarize questions, data formats, and coded responses (Appendix II).

Data were computer-entered via the University of

Alberta's Department of Rural Economy using the standard Data Entry System which enters each datum twice to ensure completely accurate data transfer. Numerous data checks were conducted, where possible, to ensure consistent data responses and accurate data computations. For example, numerical totals were recalculated on each interview and corrected if errors were found.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc. 1983). Descriptive statistics (univariate analyses) were used to initially organize and understand each parameter and its frequency distribution. Chi-square tests of association (bivariate analyses) were conducted to discover relationships between selected variables with nominal or ordinal levels of measurement (also used on variables with higher levels of measurement with collapsed categories). One-way analyses of variance (ANOVA) were used to discover relationships between selected variables when at least the dependent variable had a higher level of measurement (interval or ratio). Of course, other statistical techniques exist which could be used to analyze these data.

A significance level of 0.05 or less was used as a limit for accepting or rejecting research propositions or hypotheses. With a sample size of 603, this significance level is reasonable when making conclusions regarding statistical significance, and higher levels are tolerable only in preliminary investigations (Isaac and Michael 1981). If, for instance, the difference between two sub-sample means was found to be statistically significant, this difference can be attributed to chance only 5% of the time.

E. Restrictions of the Study

While every reasonable attempt has been made to ensure the survey design and methodology were complete and appropriate to accomplish the objectives, a number of restrictions, not already discussed, must be outlined. These may take the form of delimitations and/or assumptions, depending on the point of view taken.

Delimitations

1. The birding population was sampled during the month of May when the greatest number of bird watchers are attracted to Point Pelee National Park. Temporal extrapolations must be based on observations which indicate that expenditure and socio-economic characteristics of bird watchers are similar with other time periods. Because birding is not as popular outside of the spring season, one might expect a lower level of interest and perhaps a lower level of financial commitment in terms of economic expenditures and values.
2. In the same vein, because Point Pelee National Park is

such an internationally significant birding site in May, caution must be exercised when transferring data to other less attractive birding locations which may not generate an equal amount of economic value per capita.

3. The total economic value of bird watching at Point Pelee National Park did not include value generated by people whose primary purpose was not birding (some value attributable to birding may be generated nonetheless), value generated by off-site users (eg. birders exhibiting option value), or by value generated by birders under the age of 16 years.

Assumptions

1. The method used to measure economic expenditures and values elicits suitable responses which correctly measure these parameters.
2. Financial and logistical constraints did not permit coverage of months of the year other than May. Extrapolations to the yearly birder population from a May sample are possible if bird watchers are somewhat homogeneous throughout the year. This assumption is untested.
3. The magnitude of economic expenditures and values of birding at Point Pelee National Park are significant enough to warrant such a research study.

Despite the limitations inherent in the study, the results obtained are both useful and meaningful. Every effort was made to address each topic in an attempt to reduce bias and enhance accuracy and reliability.

F. Exploratory Survey of Other Economic Values

A preliminary attempt to measure other economic values and related factors associated with bird watching at Point Pelee National Park was made during the May field research season. The purpose of this portion of the study was to estimate benefits from birds and bird watching at Point Pelee National Park by way of use value (willingness to pay and willingness to accept compensation), existence value, inheritance value, and opportunity costs of time spent birding (ie. lost wages).

With the main park survey already occurring at Point Pelee national Park, park management requested that this portion of the study be conducted elsewhere. Hillman Marsh, a birding site located 10 km away, was selected as the alternate study site, and questions were redirected to their trip to Point Pelee National Park (the study assumed that visitors to Hillman Marsh exhibited similar values visitors to Point Pelee). All respondents had visited Point Pelee during their present trip. Hillman Marsh is managed by the Essex Region Conservation Authority, and contains a short boardwalk and viewing platform on the edge of a large marsh.

Estimates of previous or current visitation were not obtained for Hillman Marsh, so the population size is unknown. However, only those birders who had visited Point Pelee National Park on this trip and were over 16 years of age were interviewed. A short interview questionnaire, very similar to the main park questionnaire, was used to elicit data from randomly-selected respondents (Appendix III, codebook in Appendix IV). Average interview length was five minutes. Interviewing took place on Sunday, May 17 and Saturday, May 23, 1987, resulting a small sample size of 18. Data were not weighted, but were analyzed in the same manner as the main park survey.

IV. DATA RESULTS AND DISCUSSION

The data presented in this section represent the culmination of the collection and analysis process described in Chapter 3. First, in order to understand the bird watchers at Point Pelee, their socio-economic and recreational characteristics will be outlined. Next, expenditures resulting from bird watching at PPNP will be summarized. Third, the net economic value from bird watching at Point Pelee will be discussed. Fourth, relationships among variables will be addressed when they are found to be significant or conspicuous by their insignificance. Finally, other economic values, as uncovered in the exploratory survey, will be discussed.

Interviews were sought with 626 birders; the response rate was 96% (n=603). There were 57,221 birding gate visits in May, 1987, involving 16,855 individual birders.

A. Descriptive Profile of Point Pelee Birders

Socio-economic Characteristics

Sex

Fifty-nine percent of the respondents were male and 41% were female. Other studies of birder populations suggest that the proportion of males is often higher than that of females (Table IV-1). The study sample was more male-dominated than the Canadian population, which was 49% male in 1986 (Statistics Canada 1987).

Age

The mean age of birders in the sample was 49.3 years, which is higher than those of other published findings (Table IV-1), especially Frost (1985) and Hay and McConnell (1979). Frost, in particular, surveyed a population attracted to a mountainous where a lower mean age of birders would be expected.

The average age of Point Pelee birders is also higher than the Canadian average of 41.8 years, for those over 15 years of age (Statistics Canada 1987), and is reflected in the shifted age distribution (Fig. IV-1). The largest segments in the bird watcher sample are the 35-44 and 55-64 year-old age groups, suggesting that both young and older people are attracted to the sport. Bird watching requires only moderate amounts of physical exertion, thus drawing many older people.

Relevant to the economics of recreation, the older segment (age 55 and older) has significant implications. Older user groups generally have increased leisure time (especially retired people) and personal income (as children move away from home), suggesting that birders, and especially those at PPNP, have both the time and money to

Table IV-1. Socio-demographic Characteristics of Bird Watchers From Comparable Research Studies

Source	Sex (%M-%F)	Age (yrs)	Education (% with a Bachelor's degree or more)
Hvenegaard	59-41	49.3	62.4
Bird Watcher's Digest (1989)	45-55	45.0	61.0
Fenton (1988)	53-47	45.5	59.4
Frost (1985)	50-50	34.0	50.0
Kellert (1985)	73-27	42.0	67.0
Stoll and Johnson (1984)	59-41	47.0	-
Richards (1980)	-	48.0	53.0[1]
Witter and Shaw (1979)	72-28	49.0	-
Hay and McConnell (1979)	50-50	31.5	-

[1] percent with more than 16 years of education

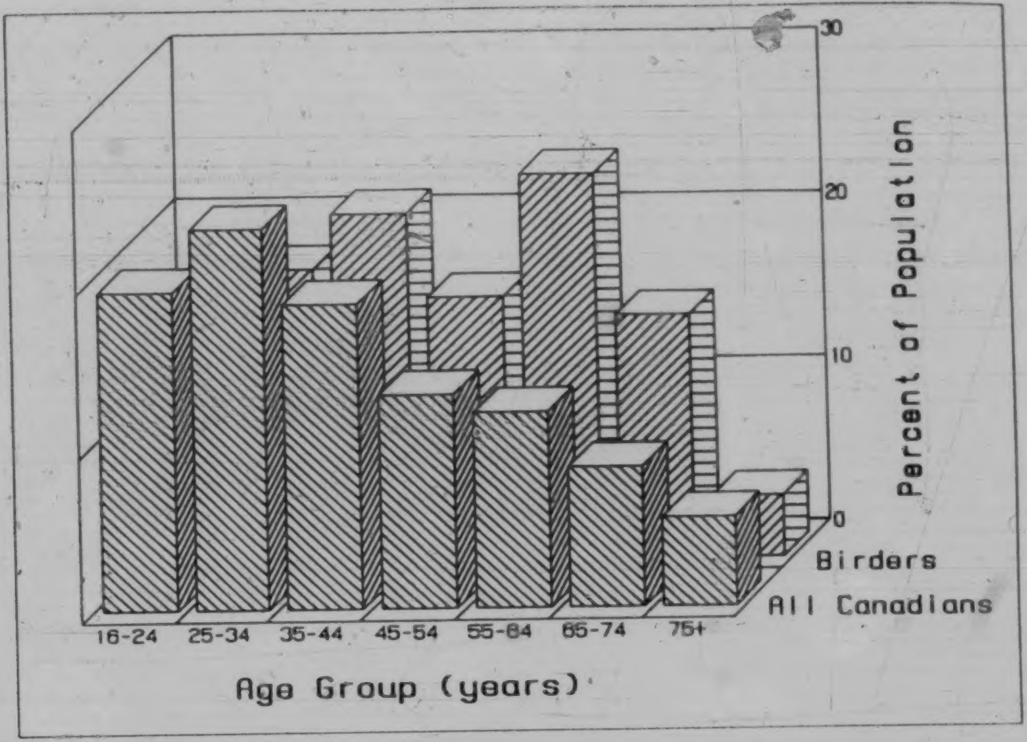


Figure IV-1. Distribution of PPNP Bird Watchers (May, 1987) and All Canadians (1986) by Age Group

spend on birding trips and vacations.

Education

PPNP Bird watchers were highly educated, with over 62% holding a bachelor's degree or more and 10% holding a doctorate degree (Fig. IV-2), comparing favorably with other research findings (Table IV-1). Over 26% of PPNP birders held advanced degrees, compared to 34% of subscribers to the Bird Watcher's Digest (BWD 1989). These levels of educational attainment are considerably higher than those of the Canadian population (Fig. IV-3). Only 10% of Canadians over 15 years of age possess the minimum of a bachelor's degree (Statistics Canada 1988a).

The average number of years of formal education was 15.8, almost the equivalent of a bachelor's degree. This is slightly less than the average of 17.0 years for members of the American Birding Association (Witter and Shaw 1979). These data agree with Hendee et al. (1971) who suggest that participants in activities dependent on appreciation of the natural environment are more highly educated, and with Swinnerton (1982) who suggests that highly educated people are more likely to participate in a wide variety of outdoor recreation activities.

These findings also suggest that birders may be more critical and discriminating about goods and services they wish to purchase. Birders may also require innovative

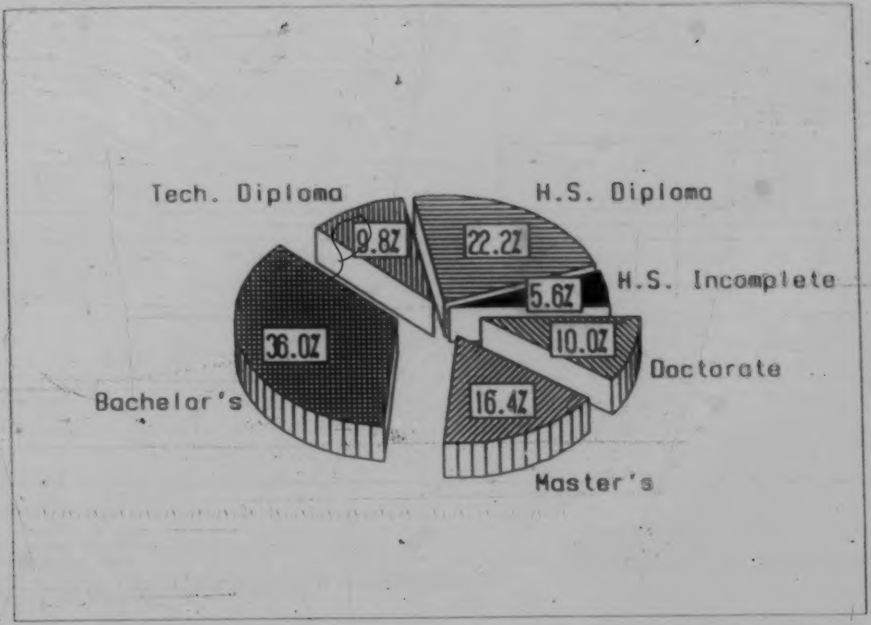


Figure IV-2. Educational Levels of Bird Watchers at PPNP - May, 1987

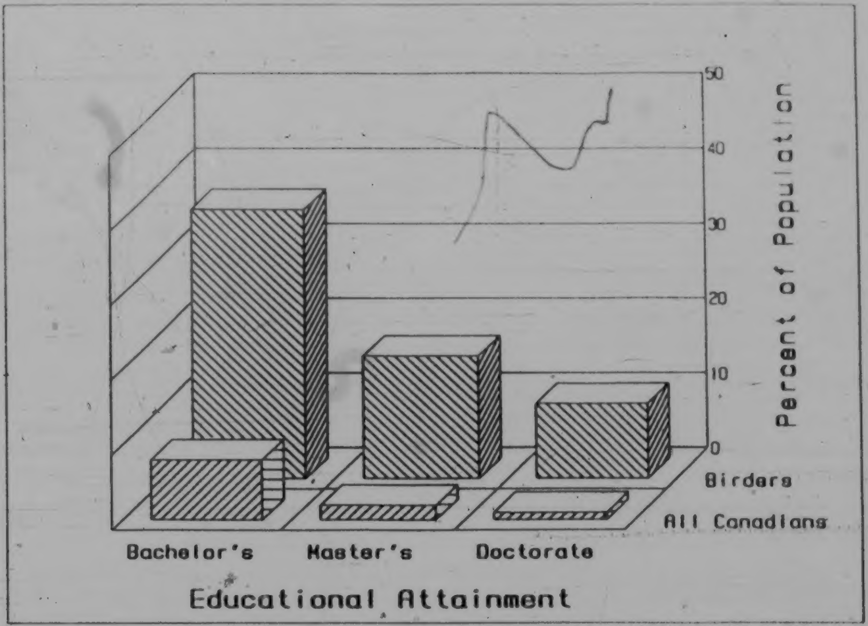


Figure IV-3. Comparison of Educational Levels between PPNP Bird Watchers and All Canadians

management techniques (eg. regulatory signage with explanations provided)

Income

Point Pelee birders reported an average 1986 gross household income of $57,175, which is 51% greater than the average 1985 family income of Canadians (Statistics Canada 1988b). In fact, more than 68% of the respondents had household incomes greater than the Canadian average of $37,827 (Fig. IV-4).

Comparatively, the average income of subscribers to the Bird Watcher's Digest, a popular birding magazine, was $40,000 US in 1988 (BWD 1989), or $49,237 CDN (conversion rate of 0.8124 - Bank of Canada 1989).

The average income per individual (dividing 1986 gross household income by the number of immediate family members living at the household) for PPNP birders was $27,973. In 1985, the average income per individual for all Canadians was $12,022 (Statistics Canada 1988b). The average number of family members living in a household of a PPNP birder, including the respondent, was 2.4, and ranged from 1 to 7.

Occupation

Of the respondents, 66.5% were working, 21.1% were retired, 7.6% were keeping house, 4.1% were students, and 0.7% were unemployed. The large retired segment clearly

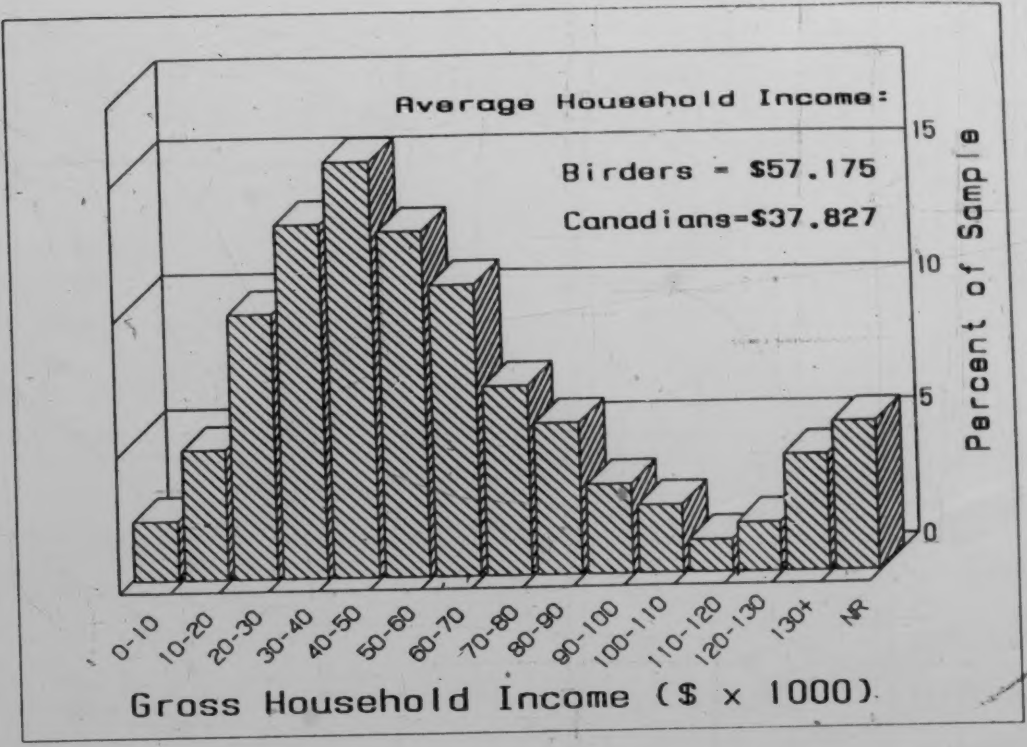


Figure IV-4. Household Income of Bird Watchers at PPNP - May, 1987

illustrates the older nature of this user group.

Bird watchers at Point Pelee had a wide variety of occupations, but a majority (57.9%) of classifiable occupations (including previous occupations of retired and unemployed respondents) were in the professional and semi-professional categories (Table IV-2). Another 22.0% had occupations as managers or proprietors. Chapman (1987) and Fenton (1988) confirmed the professional and business nature of birders. Compared to the Canadian population, birders are employed much more in professional occupations (Table IV-2).

Origin

Most of the bird watching respondents (51.2%) were international visitors (Table IV-3). In the sample, 48.4% were from the United States and 2.8% from Europe (primarily Great Britain). The final 48.8% were from Canada.

Ontario was the most common province or state of origin, followed by Michigan (Table IV-3). Other major provinces or states supplying bird watchers included New York, Ohio, Illinois, and Quebec. Most common cities of origin were Hamilton-Kitchener-Guelph, ON; Toronto, ON; Detroit, MI; and London, ON (Table IV-4).

Travel distances to Point Pelee were calculated using the most efficient one-way road route from a respondent's origin to Point Pelee (distances for overseas visitors were

Table IV-2. Distribution of PPNP Bird Watchers (May, 1987) and All Canadians (1981) by Occupational Category

Occupational Category	Bird Watchers (%)	Canadians[1] (%)
Professional and semi-professional	57.9	15.8
Managers and Proprietors	22.0	21.4
White Collar Workers	5.2	20.8
Upper Blue Collar Workers	8.5	13.9
Lower Blue Collar Workers	5.8	24.1
Farm Labourers	0.6	4.0
Total	100.0	100.0

[1] Taken from Pineo et al. (1977) and Pineo (1985)

Table IV-3. Locations of Origin for Bird Watchers at PPNP - May, 1987

Country	Province or State	Percent of Sample	
Canada	Ontario	43.0	
	Quebec	3.5	
	Other Provinces	2.3	
			48.8
United States	Michigan	23.9	
	New York	5.8	
	Ohio	4.6	
	Illinois	4.0	
	Indiana	2.0	
	Pennsylvania	1.5	
	California	1.0	
	Other States	5.6	
			48.4
Great Britain			2.7
West Germany			0.2
Total			100.0[1]

[1] Total may not add due to rounding

Table IV-4. Common Cities of Origin for Bird Watchers at PPNP - May, 1987

City or Area	Percent of Sample
Hamilton-Kitchener-Guelph area, ON	11.6
Toronto, ON	10.4
Detroit, MI	7.1
London, ON	5.5
Ann Arbor and area, MI	2.8
Windsor, ON	2.5
Montreal-Laval and area, QB	2.5
Ottawa, ON	2.3
Chicago and area, IL	2.3

Table IV-5. Travel Distances for PPNP Bird Watchers - May, 1987 (excluding overseas visitors)

Travel Distance (km) (one-way)	Percent of Sample
0-200	33.2
201-400	32.7
401-600	12.9
601-800	7.3
801-1000	4.3
1001-2000	5.3
2001-3000	1.7
3001-4000	1.1
4001-5000	1.5
Total	100.0

on a straight-line basis). The average travel distance was 688.7 km. Excluding overseas visitors, whose travel distance is difficult to quantify and compare, the average distance was 512.7 km. Of the North American respondents, 65.9% travelled 400 km or less, and only 9.6% travelled more than 1000 km (Table IV-5).

In terms of residential origin, 82.3% of the respondents came from urban settings (areas with 5000 or more residents) and 17.7% came from rural settings (areas with less than 5000 residents). In Canada, 70.9% of the population resides in urban areas (defined as above) and 29.1% in rural areas (Statistics Canada 1984). These results agree with Manning (1986) who, in a summary of other research studies, concluded that urban residents tend to have a higher participation rate in all recreational activities than do rural residents.

Recreational Characteristics

Photography

Photography is an important aspect of the bird watching experience at Point Pelee. Observational estimates of photographer type for respondents were based on type of photography equipment in possession. Snapshot photographers were those birders who possessed either a 35 mm camera and a lens not longer than 50 mm, or a non-35 mm camera. General photographers were those with a 35 mm camera and a lens suitable for general bird photography (eg. 80 to 210 mm lens). Finally, advanced photographers were those with either a 35 mm camera and a lens longer than 210 mm, or with multiple cameras suitable for bird photography. These approximate categories were further clarified throughout the interview process or when responses were given to photography-related questions.

Of the sampled birders, 40.8% were photographers. In total, 12.2% were snapshot photographers, 17.8% were general photographers, and 10.8% were advanced photographers. In 1985, 29% of Point Pelee birders were photographers (Fenton 1988) and 40% of Bird Watcher's Digest subscribers use a camera when birding (BWD 1989).

Birding Trips to Point Pelee

Birders spent an average of 3.4 days birding in the Point Pelee area; visit length ranged from 1 to 31 days in May. Most birders stayed in the Point Pelee-Leamington district a short time (26.9% for one day), but 39.7% stayed for 2 to 3 days and 33.4% stayed for 4 or more days. The overall trip length, of which the stay in Point Pelee area is a major part (63%), averaged 5.4 days.

Ninety-six percent of the respondents stated that visiting PPNP was the primary intent of their trip. This is not surprising since the passerine migration at Point Pelee is such a world-class event, drawing birders from around the world.

Point Pelee attracts birders throughout the year, but the month of highest visitation is May (Fig. IV-5), which accounted for 64.9% of the total birding gate visitation and 43.5% of the bird watchers in 1987. A larger increase in visitation in September and October was expected, corresponding with the fall migration of birds, but birds are perhaps less attractive at that time (due to less colorful fall plumage) or other activities are more prevalent.

Twenty percent of the birding respondents were first-time visitors to PPNP. The average number of previous visits was 28.6 (some local birders had been to Point Pelee several hundred times). Only 38.3% of the respondents visit PPNP more than once per year, and only 16.2% more than twice per year. A very few committed birders (5.8%) make ten or more birding trips to Point Pelee each year. These other trips most commonly occur in April, May, June, September, and October, corresponding with the spring and fall bird migrations.

Birding Experience and Intensity

The average Point Pelee birder has been actively bird watching for 15.2 years. Reflective of this older user group, many birders (7.6%) have been birding for over 40

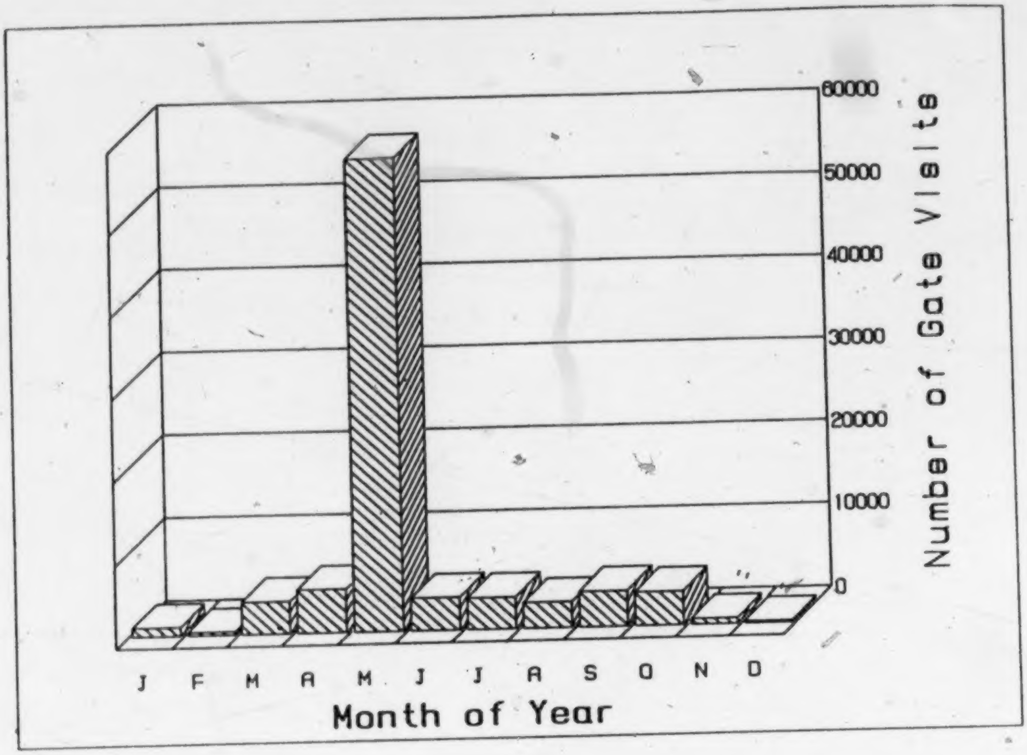


Figure IV-5. Bird Watcher Gate Visitation at PPNP in 1987

years, and one respondent reported that he had been birding for 80 years (even though he was only 84 years old). Nevertheless, for most birders, the sport is relatively new. Ten percent of the respondents had been birding for only 1 or 2 years, and 54.4% had been birding for 10 or fewer years. In comparison, subscribers to the Bird Watcher's Digest have been birding, on average, for 17 years (BWD 1989).

Point Pelee birders participate an average of 35.6 days per year in their sport. Only a few avid birders (5.7%), one of whom was a birding tour ~~guide~~, reported birding over 100 days per year. The majority of birders (68.9%) reported birding on 30 or fewer days each year.

B. Economic Analysis of Birding at Point Pelee

Bird watchers were asked to report all travel expenditures on their present trip; the proportion attributable to bird watching at PPNP was based on the number of days spent at the park relative to their entire trip. Because of the variety of payment method for park entrance fees (eg. daily, weekly, yearly), an overall average of $1 was assigned to each individual birder for entrance fee costs.

Birders also reported expenses on bird watching equipment in the past year (on items used at PPNP). The proportion attributable to the present trip was based on the number of days birding at the park and throughout the year. The percentage of use for birding for each piece of equipment was also taken into account. Expenditure data were weighted according to weekend/weekday visitation (due to different expenditure rates), so mathematical calculations for monthly and annual expenditures made from information presented may differ from those provided.

Expenditures by May Birders

Total bird watcher expenditures, arising from their combined trips to Point Pelee in May, 1987, amounted to $3.8 million (Table IV-6 and Fig IV-6/7). Most significant expenditure areas involved were travel (27.2%), food (26.3%), accommodation (22.5%), and equipment (13.4% - Fig. IV-6). The amount reportedly spent on film ($183,513) was substantially lower than Butler and Fenton's (1987) estimate of $710,000 for film and development in May, 1985, which was extrapolated from data on the number of pictures taken.

The average bird watcher at Point Pelee in May spends $224.23 per trip or $66.05 per day of birding at Point Pelee. Of course, not all of this is spent in the local area; only $126.00 per trip or $37.11 per day of birding is spent in the Leamington area. Local expenditures reported by visiting bird watchers amounted to $2.1 million in May, 1987 (Fig. IV-7), and are estimated to be $3.2 million for

Table IV-6. Expenditures by Bird Watchers at PPNP - May, 1987

Category	Percent of Sample Using	Avg $/trip for All Birders	Total $ for May
Travel	99.5	60.95	1,027,374
Food	98.7	58.89	992,659
Accommodation	73.6	50.45	850,300
Equipment attributable to PPNP trips	82.6	30.03	506,087
Film	27.5	10.89	183,519
Souvenirs	42.1	8.17	137,785
Entrance Fee	100.0	1.00	16,855
Entertainment	4.8	0.90	15,147
Other	11.6	2.95	49,641
Total		224.23	3,779,367

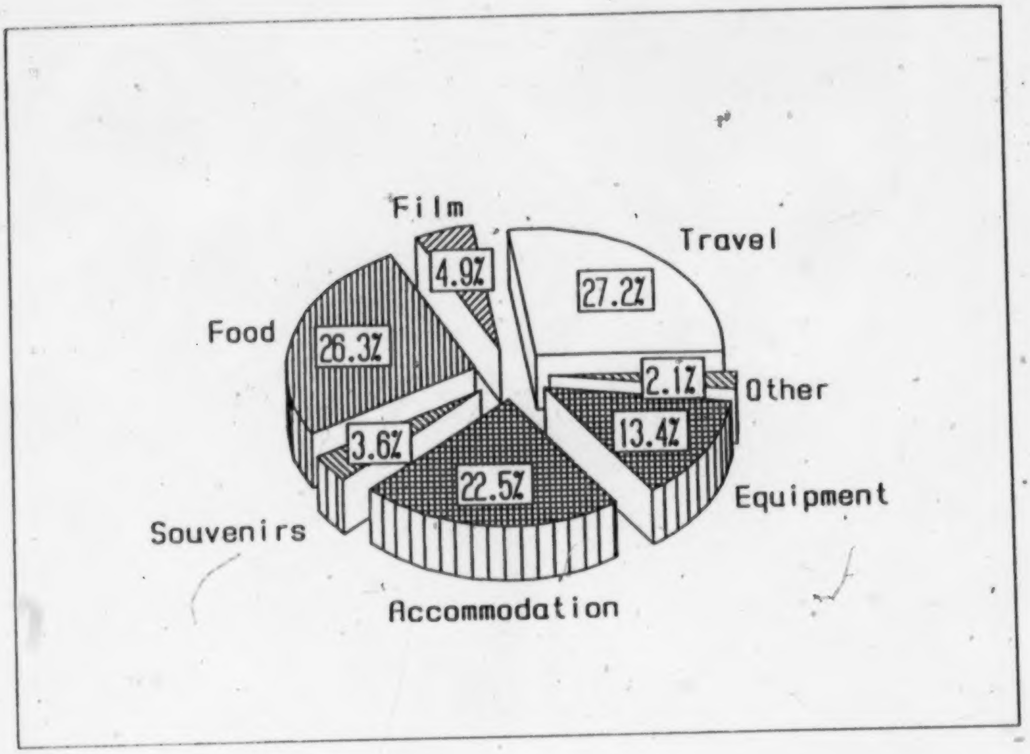


Figure IV-6. Expenditure Areas for Bird Watchers Visiting PPNP - May, 1987

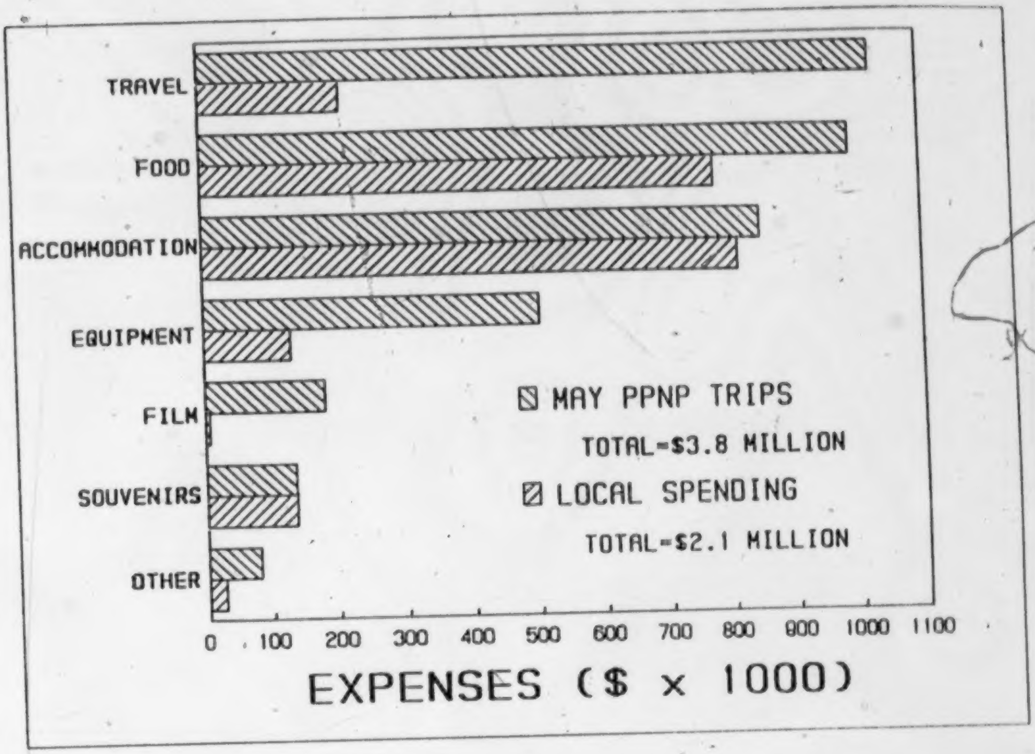


Figure IV-7. Total and Local Expenditures by Bird Watchers Visiting PPNP - May, 1987

the entire year.

To travel to Point Pelee, 92.5% of the respondents used their personal vehicles (Table IV-7). A small, but important segment (7.5%) travelled by airplane. This portion included all overseas and distant North American visitors. During the peak birding season at Point Pelee, wealthy businessmen reported taking time off work to travel to Point Pelee via personal airplanes to experience the most productive time periods for bird migration and observation. These periods are difficult to forecast and often last only 2 or 3 days.

Costs were incurred for food at restaurants and hotels by 76.1% of the respondents and at grocery stores by 73.6%. Average expenditures per trip for food in restaurants were greater than in grocery stores (Table IV-8).

Seventy-three percent of the birders at Point Pelee stayed longer than one day in the area and required overnight accommodation. Hotels and motels were used by 49.6% of the respondents and campgrounds by 23.5% (Table IV-9). Again, average expenditures per trip on hotels and motels were greater than those on camping.

The most common type of birding equipment bought by respondents in the past year (Table IV-10) was some form of bird literature (eg. bird guides, books, and magazines). Other common birding items used at Point Pelee and bought in the past year included field clothing, binoculars, and

Table IV-7. Breakdown of Travel Expenditures for Bird Watchers at PPNP - May, 1987

Sub-Category	Percent of Sample Using	Avg $/trip for Users	Total $ for May
Airfare	7.5	283.96	312,416
Personal Vehicle	92.5	30.24	472,519
Vehicle Rental	7.0	171.36	184,256
Other	4.3	80.24	58,184
Total	(99.5)		1,027,374[1]

[1]Total may not add due to rounding

Table IV-8. Breakdown of Food Expenditures for Bird Watchers at PPNP - May, 1987

Sub-Category	Percent of Sample Using	Avg $/trip for Users	Total $ for May
Restaurants	76.1	55.42	715,240
Groceries	73.6	22.20	277,419
Total	(98.7)		992,659

Table IV-9. Breakdown of Accommodation Expenditures for Bird Watchers at PPNP - May, 1987

Sub-Category	Percent of Sample Using	Avg $/trip for Users	Total $ for May
Hotel/Motel	49.6	91.27	745,736
Camping	23.5	23.20	89,865
Friends	0.5	63.10	3,923
Other	1.2	65.84	10,777
Total	(73.6)		850,300[1]

[1]Total may not add due to rounding

Table III-10. Equipment Expenditures by Birders at PPNP - May, 1987

Item	% Buying in past year	Avg $/yr For Buyers	Avg % Use for Birding	Total $ May PPNP trips
Camera Equipment	16.6	345.34	60.9	124,719
Binoculars	24.2	232.10	95.1	141,494
Scopes	5.3	304.04	99.7	42,859
Literature	57.7	69.00	98.0	101,000
Clothing	25.5	63.31	74.3	39,779
Footwear	21.6	35,37	62.3	18,056
Records/Tapes	17.1	31.49	100.0	14,563
Tape Recorders	4.8	74.01	57.2	5,220
Packs/bags	11.8	22.89	81.1	7,448
Notebooks/Pens	9.3	9.61	95.2	2,106
Other	9.3	23.82	89.2	8,842
Total				506,087[1]

[1] Total may not add due to rounding

footwear. The worth of all equipment used at Point Pelee and purchased in the past year was $3.6 million, or $211 per person (distribution shown in Fig. IV-8). A total of $506,087 of this was attributable to the birding experience at Point Pelee, though only $133,749 was spent locally (Fig IV-9).

Net Economic Value of Birding at Point Pelee

The net worth of bird watching at Point Pelee includes more than just dollars spent. Economic measures of satisfactions gained from the sport, above existing expenditures, reflect its true economic value. After bird watchers had listed the expenditures for their current trip to Point Pelee, they were asked "Considering the enjoyment you have received from birding here at PPNP, would you still have made this trip if your total costs had been more?" Only 0.5% answered "no" (n=3).

The remaining birders were asked "What is the most your costs on this trip could have risen before deciding not to come birding at PPNP?", given that trip characteristics such as trip length and frequency remained constant. Respondents were given the option to answer directly in terms of dollars or indirectly in terms of percent of their existing trip expenses. If no answers came forth, a bidding game was initiated, beginning at 100% and raised or lowered at reasonable increments until the answer did not change.

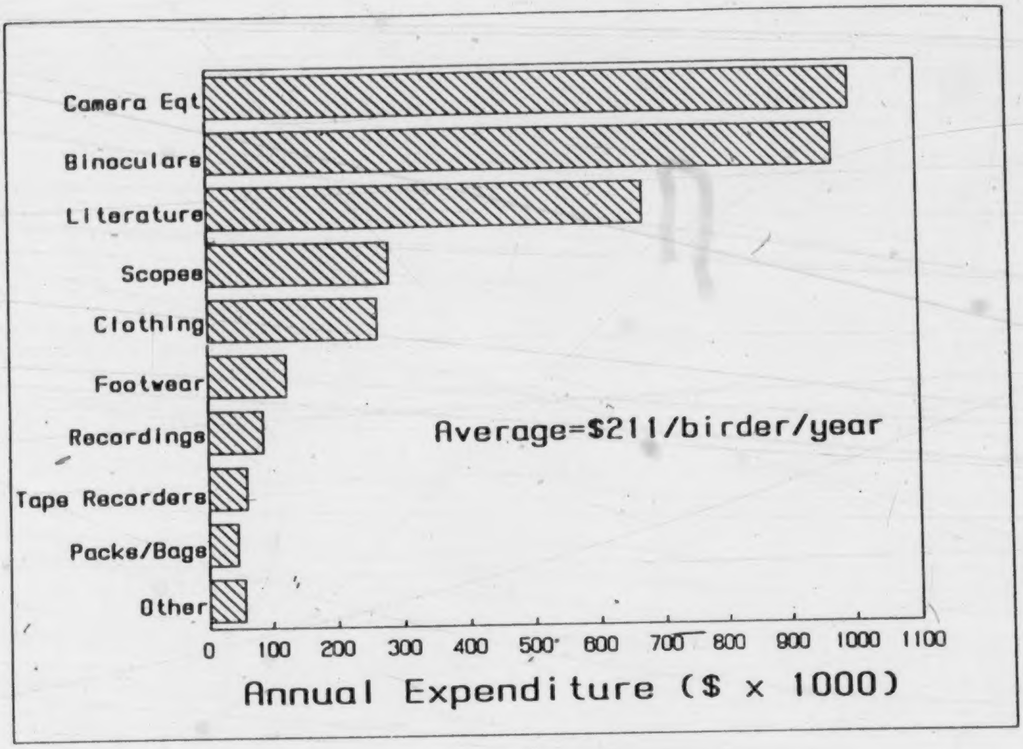


Figure IV-8. Annual Equipment Expenditures by Bird Watchers Visiting PPNP

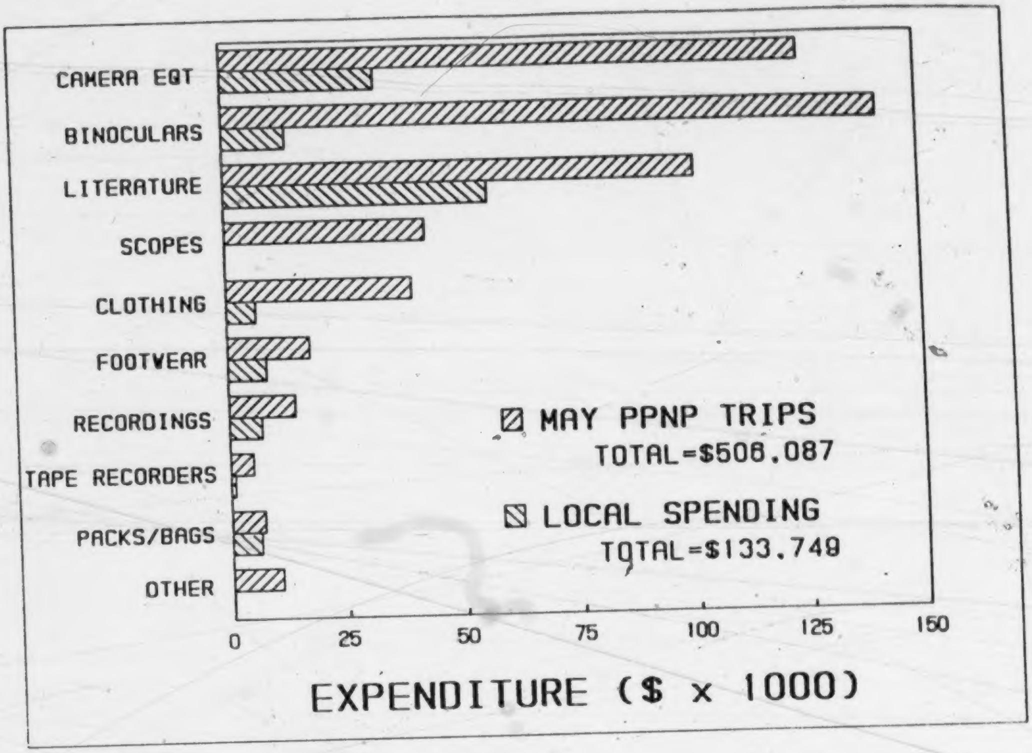


Figure IV-9. Equipment Expenditures by Bird Watchers Visiting PPNP - May, 1987

Of the remaining 600 possible respondents, 25 chose not to reply, resulting in an overall response rate to the question of 95.4% (n=575). Of these respondents, 38.3% answered in terms of dollars and 61.7% in terms of percent. Over 75% of the respondents choosing the latter method stated that their costs could have at least doubled. After converting the percentage answers to dollars, the average response was $255.64 per trip or $92.72 per day. However, weighting stated values according to length of stay at Point Pelee results in a more accurate estimate of individual value of $75.70 per day for respondents. For May, 1987, the net economic value of birding at PPNP was $4,132,375 (non-market portion). Of course, the minor entrance fee (market portion) of $1/person/trip should be added to arrive at an overall value for the wildlife component of birding at Point Pelee. This amounts to $4,149,230 for May, 1987.

These results compare favorably with other similar research studies. Horvath (1974) found the average use value for bird enjoyment in the southeastern United States was $65.40 US/day, and Richards (1980) found the average use value for bird watching in southeastern Arizona was $79 US/day.

Extrapolations of Value and Expenditures for 1987

Based on 1987 visitation figures, the total economic efficiency and impact values resulting from birding at PPNP can be calculated. Of course, value and expenditure rates will likely decline in the birding off-season because the attraction is not as desirable (based on monthly visitation rates), people will travel less from afar, and trip lengths will be shorter (Canadian Parks Service 1986). As will be discussed in the next section on correlative propositions, value per day is higher for shorter trips, but will likely decline when the birds are not as colorful or concentrated. As well, daily expenditures will decline as trip length is shortened and as travel distance is reduced.

Therefore, estimates of value per day and expenditures per day have been adjusted accordingly to $70 and $50 per day, respectively (Table IV-11). Thus, bird watching at PPNP in 1987 is estimated to have generated $6.3 million in net economic value and $5.4 million in economic impact or expenditures.

C. Correlative Propositions

The objective of this portion of the study was to test for correlations between various dependent variables of the bird watching experience and selected socio-economic and recreational characteristics. The correlative propositions were broad statements about the relationships between a group of variables. Subpropositions were succinct statements about the proposed relationship between two distinct variables. Statistical analyses used include one-

Table IV-11. Estimates of Economic Value and Expenditures Resulting From Bird Watching at PPNP in 1987

A. Economic Value (based on 95.4% response rate):

Months	Avg $/day	Gate Visits	Stated Value	Entrance Fees ($)	Total Value ($)
May	75.70	57221	4,132,375	16,855	4,149,230
Other	70.00	31713	2,117,794	38,765	2,156,559
Total			6,250,169		6,305,789

B. Expenditures:

Months	Average $/day	Gate Visits	Total ($)
May	66.05	57221	3,779,447
Other	50.00	31713	1,585,650
Total			5,365,097

way analyses of variance and cross-tabulations, based on a significance probability of 0.05 (probabilities reported as P=.00 in subsequent tables actually signify a probability level less than .01).

The subpropositions alluded to in Chapter I are stated in specific format, and the results of the associated tests are summarized. Variables such as occupation were not used as an indicator for causal relationships because previous research has shown the effects of occupation are inconclusive (Dardis et al. 1981), and are overshadowed by other factors like education and income (Swinnerton 1982). As well, categorization and ranking of occupations suffers from subjective decisions.

For proper statistical analyses, variables were necessarily broken down into manageable categories to allow for theoretical conclusions about relationships. Categories of variables used in these analyses are described in Table IV-12.

Economic Value

The dependent variable involved in this section is value/day, which is the stated net economic value (or amount of enjoyment) per day received by a birder at Point Pelee National Park (PPNP).

A1. **There is a significant difference in economic value between photographers and non-photographers.** No significant

Table IV-12. Categories of Variables Used in Correlational Analyses

Variable	Unit	Categories
Photographer Type	-	photographer, non-photographer
	-	snapshot, general, advanced
Experience Level	years	0-5, 6-10, 11-20, 20+
Participation Rate	days/yr	1-15, 16-30, 30+
Familiarity with PPNP	# visits	0-1, 2-5, 6+
Length of Stay	days	1, 2-3, 4+
Distance Travelled (one way)	km	1-250, 251-500, 501-1000, 1000+
Income Level	$/person/yr	1-15000, 15001-30000, 30001+
Education	highest	No high school diploma, high school, technical diploma, bachelor's, master's, doctorate
	-	with a bachelor's, without a bachelor's
Age	years	16-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75+
	years	16-20, 21-40, 41-60, 60+

difference was found in value/day between photographers and non-photographers.

A2. **There is a significant difference in economic value between various types of photographers.** No significant difference was found in value/day among the various types of photographers.

A3. **There is a significant difference in economic value between groups of birders with various experience levels.** No significant difference was found in value/day between groups with different experience levels. Value/day was expected to decrease as birding experience increased, based on Applegate and Clark (1987) who found that more competent birders had lower satisfaction levels than less competent birders. These lower satisfaction levels were expected to result in lower economic values for bird watching. Applegate and Clark (1987) suggested that more competent birders are perhaps more difficult to satisfy because they have a higher degree of goal specificity than less competent birders.

A4. **There is a significant difference in economic value between groups of birders with various participation rates.** No difference was found in value/day among groups with different participation rates.

A5. **There is a significant difference in economic value between groups of birders with various levels of familiarity with Point Pelee.** No correlation was found between value/day and familiarity with Point Pelee.

A6. **There is a significant difference in economic value between groups of birders who stay at Point Pelee for one day, 2-3 days, and 4 or more days.** Value/day decreased as birders stayed longer at the park (Fig. IV-10 and Table A5-1 - tables with the prefix "A5" are found in Appendix V), supporting the previously-discussed concept of diminishing marginal utility. Personal fascination and enjoyment with a birding location seems to diminish or has a decreasing marginal rate of utility over time. As well, since value was derived indirectly as a function of travel expenditures, it will decrease with longer visits, corresponding with travel expenditures.

A7. **There is a significant difference in economic value between groups of birders who have travelled various distances from their origin to Point Pelee.** No difference was found in value/day for various travel distances.

A8. **There is a significant difference in economic value between birders with different countries of origin.** No significant difference in value/day was found among birders of different nationalities. Canadian and American birders had nearly identical value estimates, but European birders tended to have lower values, though statistically insignificant.

A9. **There is a significant difference in economic value between birders from urban residences and those from rural**

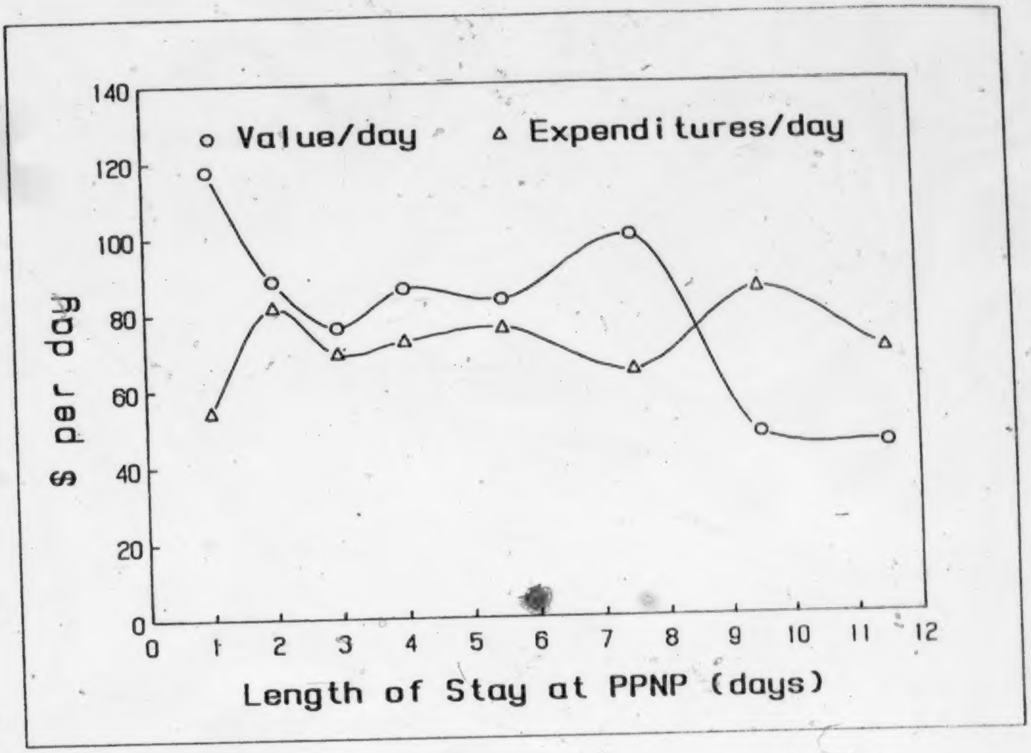


Figure IV-10. Relationship Between Daily Economic Values (Impact and Efficiency) and Length of Stay

residences. Value/day was not correlated with birder residence size.

A10. **There is a significant difference in economic value between groups of birders with various income levels.** Value/day of high income birders was 84% and 53% greater than low and middle income birders, respectively (Table A5-2). This confirms Brown's (1984) notion that valuation depends on an individual's context and personal state (eg. income, preferences, etc.).

A11. **There is a significant difference in economic value between groups of birders with various educational attainment levels.** No significant difference was found to exist for value/day with different levels of educational attainment.

A12. **There is a significant difference in economic value between various age groups of birders.** No significance difference was found in value/day with various age groups of birders.

A13. **There is a significant difference in economic value between male and female birders.** No difference was found in value/day between male and female birders.

In summary, value/day decreases with length of stay, but increases with a birder's income level. Value/day was not correlated with other variables in this analysis.

Travel and Equipment Expenditures

The dependent variables used in this section are expenditure/day, travel/day, and equipment/year. Expenditure/day is the amount of expenditures per day of a birding trip to PPNP. Travel/day is the amount of travel costs incurred to visit PPNP per day of visit (includes everything except equipment). Equipment/year is the amount spent on birding equipment in the past year. Other more specific variables such as expenditures on hotels, binoculars, or camera equipment are introduced where relevant.

B1. **There is a significant difference in travel and equipment expenditures between photographers and non-photographers.** Differences were found between photographers and non-photographers on the basis of expenditure/day, travel/day, and equipment/year (Fig. IV-11, Table A5-3). Photographers spend 48.0% more per day of their birding trips to PPNP than do non-photographers. Photographers also spend 41% more on travel/day and 84% more on equipment/year than non-photographers. Photographers spend over ten times more each year on camera equipment and almost 45 times more on film for PPNP than non-photographers (Fig. IV-11). As expected, photographers were more likely to have purchased camera equipment in the past year (X^2=41.05, 1 df, P=.00), and were more likely to have travelled by airplane to Point Pelee (X^2=6.56, 1 df, P=.01) than non-photographers.

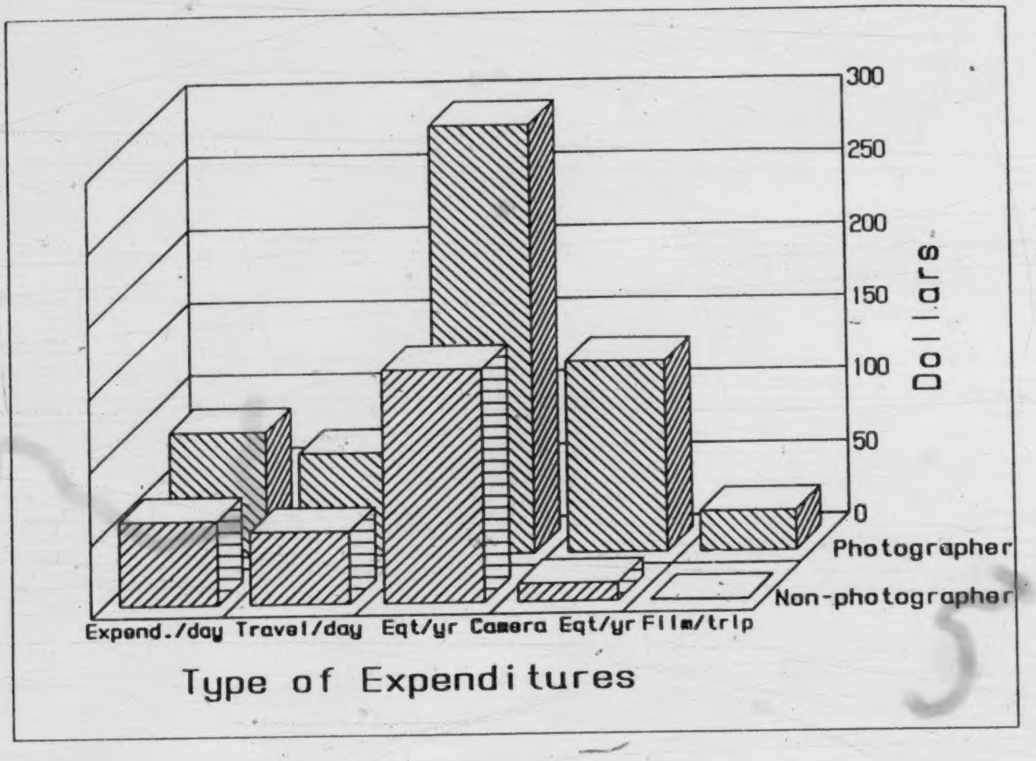


Figure IV-11. Trip and Equipment Expenditures for Photographers and Non-photographers

Photographers were not more likely to buy binoculars, tape recorders, or scopes.

B2. **There is a significant difference in travel and equipment expenditures between various types of photographers.** Expenditure/day increased with a corresponding increase in photographic involvement (Fig.IV-12, Table A5-4). Advanced photographers spent 52% more per day than snapshot photographers and 34% more than general photographers. No significant differences were found in travel/day among the different types of photographers, but the data suggest that travel costs increase for more committed photographers.

In terms of equipment/year, advanced photographers spend 333% more than snapshot photographers and 166% more than general photographers. These trends were also significant when isolating camera equipment and bird literature bought each year. Advanced photographers spent $77 on film for bird photographs at PPNP, whereas general photographers spent only $14 and snapshot photographers only $2. Advanced and general photographers were more likely to have purchased camera equipment in the past year than general and snapshot photographers (X^2=11.79, 2 df, P=.00). The degree of photographic involvement did not affect the likelihood of purchasing binoculars, tape recorders, or scopes.

B3. **There is a significant difference in travel and**

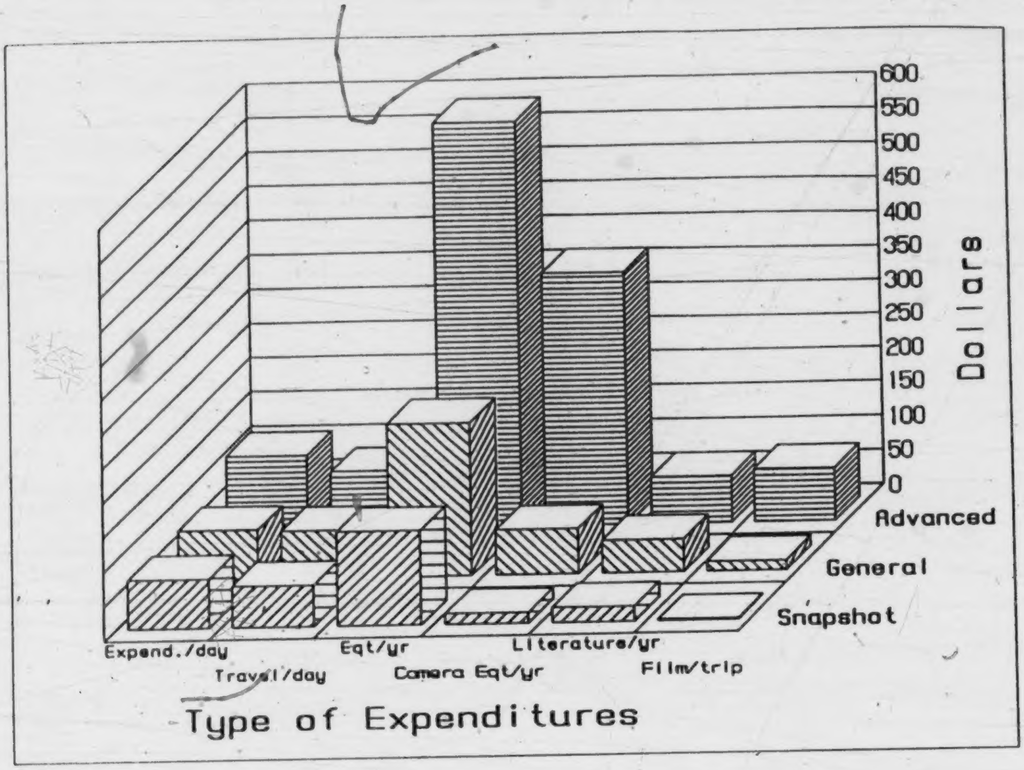


Figure IV-12. Relationship Between Birding Expenditures and Photographer Type

equipment expenditures between groups of birders with various experience levels. No differences were found in expenditure/day or travel/day among groups of birders with different experience levels. However, there are differences in equipment/year for various experience levels (Fig. IV-13, Table A5-5). Birders with 3-10 of experience spend the most on birding equipment and first-time birders (less than 3 years experience) spend the least. After being introduced to the sport, novice birders seem to delay investing substantial amounts of money until they have birded for at least 3 years and have become more committed to the sport. At that time, birders spend the most on birding accessories as the need for more sophisticated and detailed equipment, and perhaps the desire to learn about birds, is the highest. During later periods of a birder's career, equipment expenditures taper off slightly as much of the necessary equipment has already been accumulated.

Expenditures per year on items such as binoculars, camera equipment, tape recorders, bird literature, and scopes were not related to birding experience. The two categories of moderately-experienced birders were more likely to have purchased camera equipment in the past year than were beginning and more experienced birders (X^2=8.27, 3 df, P=.04). They were also more likely to have used airplanes to travel to the park (X^2=8.96, 3 df, P=.03).

B4. **There is a significant difference in travel and**

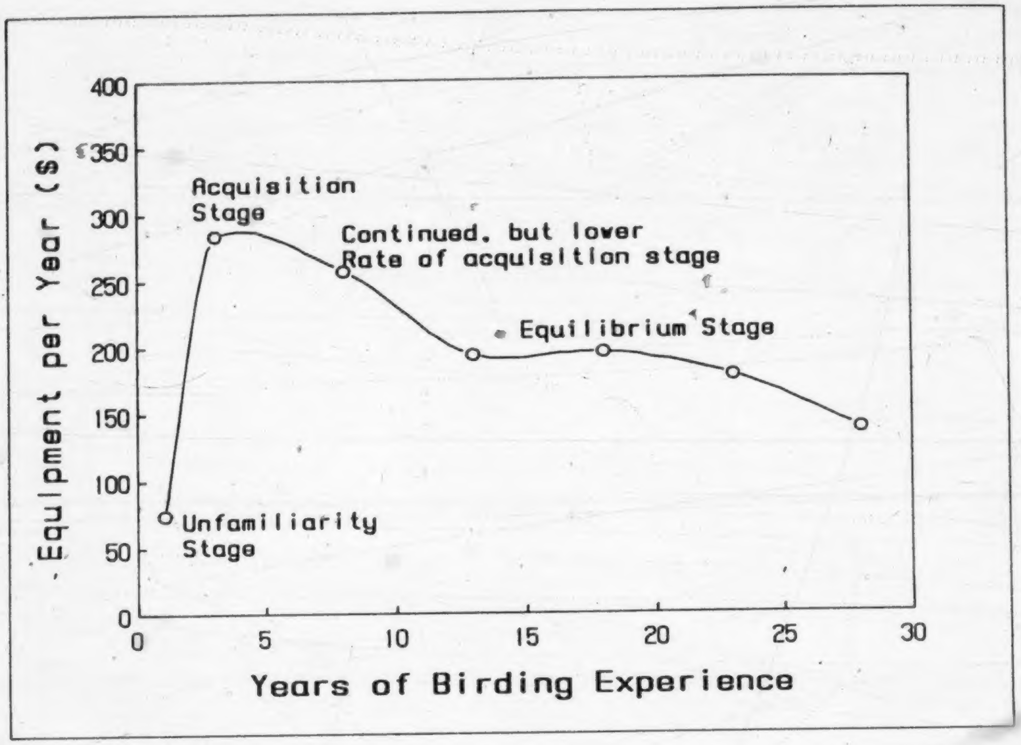


Figure IV-13. Relationship Between Rate of Birding Equipment Purchases and Experience Level

equipment expenditures between groups of birders with various participation rates. Expenditure/day and travel/day were not correlated with rate of participation in birding.

Equipment/year was positively correlated with participation rates (Table IV-13). Birders with higher participation (31 or more days birding/year) had annual equipment costs 223% higher than birders with low participation rates (1-15 days/year) and 44% higher than birders with moderate participation rates (16-30 days/year). As birders become more committed to their sport, they will spend more each year on birding equipment, such as bird literature, binoculars, and tape recorders. For example, most committed birders spent $62 per year on bird literature, whereas the least committed birders spent only $21 per year. Most committed birders were more likely to have purchased binoculars (X^2=8.36, 2 df, P=.02) and tape recorders (X^2=9.18, 2 df, P=.01) in the past year, than moderate or least committed birders (but not camera equipment or scopes. A similar result was found in the likelihood to have used an airplane to travel to Point Pelee (X^2=18.64, 2 df, P=.00).

B5. **There is a significant difference in travel and equipment expenditures between groups of birders with various levels of familiarity with PPNP.** There were differences in expenditure/day between groups of birders with various levels of familiarity with Point Pelee (Table

Table IV-13. Annual Equipment Expenditures Compared with Level of Birding Participation

Participation (days/year)	Eqt/year ($)	Literature/ year ($)	Binoculars/ year ($)	Recorders/ year ($)
1-10	105.45	21.01	28.24	0.41
11-30	236.35	40.86	53.90	1.86
31 or more	340.72	62.11	97.70	8.50
Statistics:	F=18.03 P=.00	F=13.56 P=.00	F=10.56 P=.00	F=3.07 P=.05

Note: 2 degrees of freedom for each test of analysis of variance

A5-6). This may only reflect the fact that birders who are more familiar with PPNP live closer to the park, and as a result, have lower expenses/day (see subproposition B7).

B6. **There is a significant difference in travel and equipment expenditures between groups of birders who stay at Point Pelee for one day, 2-3 days, and 4 or more days.** Expenditure/day was found to be different among birders who stay at Point Pelee for various lengths of time (Fig. IV-10, Table A5-1). Increasing as a visitor stays overnight, the rate then decreases the longer a visitor stays. Birders staying overnight spend 37% more per day than birders who stay only one day ($74.07/day versus $54.22/day, respectively - F=13.47, 1 df, P=.00). A larger difference in expenditure rates was expected, but day users obviously spend large amounts of money as well.

B7. **There is a significant difference in travel and equipment expenditures between groups of birders who have travelled various distances from their origin to Point Pelee.** Expenditure/day steadily increased with increases in travel distances (Fig. IV-14 and Table A5-7). Fesenmaier and Lieber (1987) also found that expenditure/day increased as a function of distance, but only to a point.

B8. **There is a significant difference in travel and equipment expenditures between birders with different countries of origin.** In terms of expenditure/day, Europeans spent the most, corresponding to their large travel costs

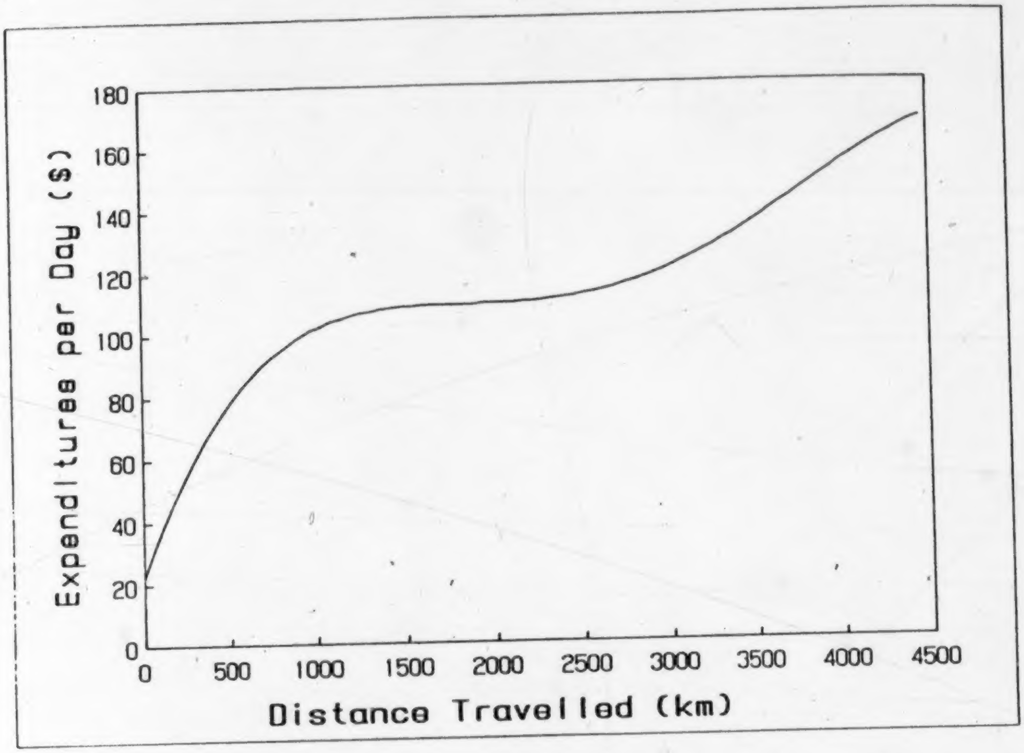


Figure IV-14. Relationship Between Birding Expenditure Rates and Distance Travelled

(Table IV-14). Americans spent slightly more per day than Canadians. Travel/day was highest for international birders. European birders spent 101% more than Canadians and 75% more than Americans on travel/day. Americans had travel costs/day 15% greater than Canadians. In terms of accommodation/day and food/day, there were no significant differences among countries, as would have been expected.

Europeans spent the most on equipment/year and Canadians spent the least (Table IV-14). Europeans also spent the most per year on bird literature and spotting scopes. As expected, Europeans were more likely to have travelled by airplane to Point Pelee than Canadians or Americans (X^2=145.12, 2 df, P=.00).

B9. **There is a significant difference in travel and equipment expenditures between birders from urban residences and those from rural residences.** No differences in expenditure/day, travel/day, or equipment/year were found between urban and rural residents, even though Dardis et al. (1981) found that urban households spend more on recreation than rural households. As well, the likelihood of purchasing various types of birding equipment was not correlated with residence size.

B10. **There is a significant difference in travel and equipment expenditures between groups of birders with various income levels.** Expenditure/day of high income birders was 62% and 17% greater than low and middle income

Table IV-14. Comparison of Birding Expenditures with Country of Origin

Expenditure Category	Expenditures ($)			Statistics	
	Canada	United States	Europe	F	P
Expenditures/day	61.53	73.42	112.97	7.94	.00
Travel/day	52.57	60.40	105.72	9.79	.00
Equipment/year	168.40	238.82	529.13	7.02	.00
Literature/year	28.64	44.29	125.89	12.29	.00
Scopes/year	16.46	12.71	102.94	9.21	.00

Note: 2 degrees of freedom for each test of analysis of variance

birders, respectively (Table IV-15). In addition, Zuzanek (1978), Thompson and Tinsley (1979), and Dardis et al. (1981) found that expenditures on recreation and leisure are positively correlated with income. Zuzanek (1978) went on to say that family income, rather than education or occupation, seems to have the most direct effect on the size of expenditures.

Travel/day and equipment/year were positively correlated with income (Table IV-15). High income birders spent much more on travel/day and equipment/year than low and middle income birders. High income birders also spent more on binoculars and bird literature each year than low and middle income birders. No differences were found for camera equipment or spotting scopes. High income birders were more likely to have purchased tape recorders in the past year than middle and low income birders (X^2=7.37, 2 df, P=.03).

B11. **There is a significant difference in travel and equipment expenditures between groups of birders with various educational attainment levels.** No difference was found in expenditure/day when 6 levels of educational attainment were used. When the possession of a bachelor's degree was the dividing point, birders with bachelor's degrees spent 22% more per day than those without bachelor's degrees (Table IV-16). Dardis et al. (1981) and Fesenmaier and Lieber (1987) also found that expenditure/day was

Table IV-15. Comparison of Birding Expenditures with Income Levels

Expenditure Category	Income/Individual ($/year)			Statistics	
	0-15000	15001-30000	30001+	F	P
Expenditures/day	50.79	70.10	82.28	13.11	.00
Travel/day	43.65	57.05	70.20	12.97	.00
Equipment/year	156.74	197.20	287.23	4.58	.01
Binoculars/year	37.00	44.92	90.04	6.02	.00
Bird Literature/yr	25.34	31.86	56.92	7.64	.00

Note: 2 degrees of freedom for each test of analysis of variance

Table IV-16. Comparison of Birding Expenditures with Educational Levels

Expenditure Category	Expenditures ($)		Statistics	
	Less than a Bachelor's	Bachelor's	F	P
Expenditure/day	60.29	73.84	7.43	.01
Travel/day	52.63	61.02	3.89	.05
Equipment/year	151.03	249.88	7.76	.01
Binoculars/year	38.11	67.66	14.83	.03
Bird Literature/year	27.32	45.99	7.02	.01

Note: 1 degree of freedom for each test of analysis of variance positively correlated with education. Birders with bachelor's degrees spent 16% more on travel/day and 65% more on equipment/year than birders without bachelor's degrees. The amounts spent on binoculars and bird literature were 76% and 68% higher, respectively, by birders with bachelor's degrees than those without. Education did not affect the likelihood of purchasing specific kinds of birding equipment in the past year.

B12. **There is a significant difference in travel and equipment expenditures between various age groups of birders.** Expenditure/day and travel/day were correlated with birder age (Fig. IV-15). Both increased with age, to a maximum at ages 40-60, and then decreased as birders got older. Dardis et al. (1981) also found that households in the middle of the family life cycle (presumably middle-aged) spend more on recreation than households located at either extreme. Expenditures on hotels/motels and in restaurants also increased with a birder's age (Table A5-8). Lower expenditure rates on camping and groceries were expected with older birders, but no differences were found.

No significant differences were found in equipment/year for various age groups of birders. Age did not affect the likelihood of having purchased binoculars, camera equipment, tape recorders, or spotting scopes in the past year.

B13. **There is a significant difference in travel and equipment expenditures between male and female birders.** No

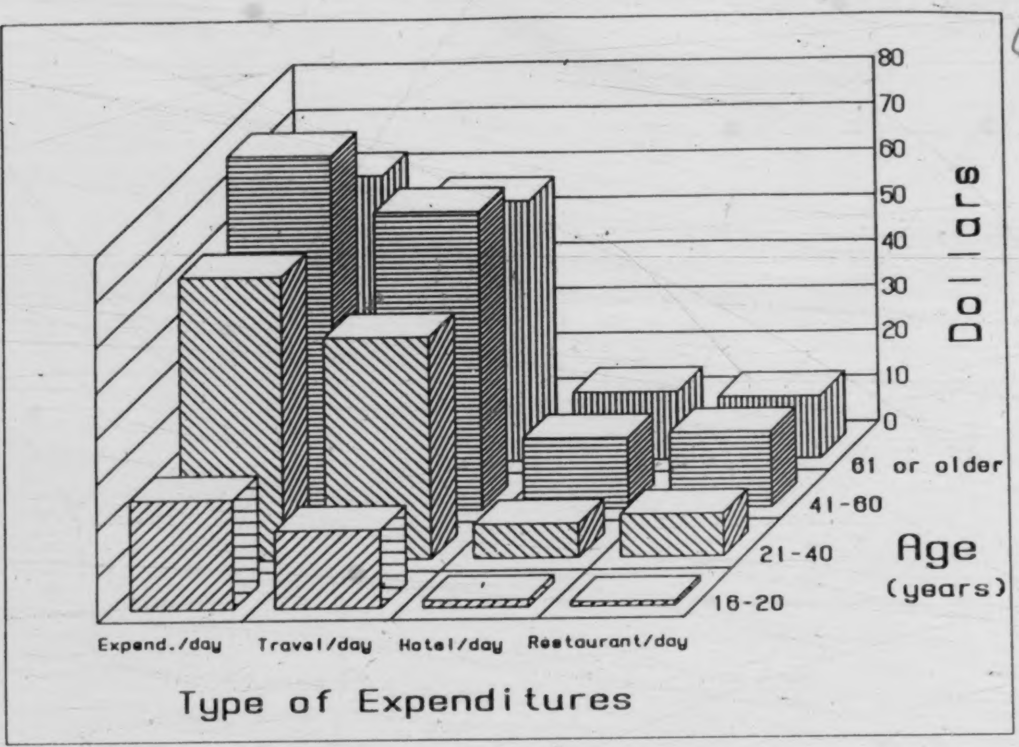


Figure IV-15. Birding Expenditures for Various Age Groups

differences were found in expenditure/day or travel/day between male and female birders. However, male birders spent 51% more on equipment/year than female birders ($246.63 versus 163.38/year - F=5.65, 1 df, P=.02). Much of this difference is accounted for by differences in average annual expenditures on camera equipment and bird literature. Sex did not affect the likelihood of purchasing various kinds of birding equipment in the past year. As heads of the family, males might be expected to purchase equipment on behalf of the family. However, the initiative to purchase birding equipment reflects a strong interest in the sport.

In summary, expenditures are positively correlated with photographic involvement, distance, country (more distant), income, education, and with mid-life age groups. Expenditures on equipment were highest for male birders, those with 3-10 years of experience, and those with high participation rates. Daily expenditures decreased with longer stays at Point Pelee.

Photographer Type

As mentioned earlier, birders were classified as photographers and non-photographers. Photographers were further classified into snapshot, general, and advanced categories.

C1. **There is a significant difference in photographer type between groups of birders with various experience**

levels. Least experienced birders (0-5 years birding) were much more likely to be non-photographers than photographers (Table IV-17). Experience level was not correlated with level of interest in photography.

C2. **There is a significant difference in photographer type between birders with different levels of participation in birding.** The rate of participation in birding did not affect the likelihood of being a photographer, but once an interest in photography started, most committed birders were much more likely to be advanced photographers than snapshot photographers (Table IV-18). As well, least committed birders were much more likely to be snapshot photographers than advanced photographers.

C3. **There is a significant difference in photographer type between birders with different countries of origin.** Birders from Europe were much more likely to be photographers than non-photographers (Table A5-9). Country of origin was not correlated with degree of interest in photography.

C4. **There is a significant difference in photographer type between birders from urban residences and those from rural residences.** Residence size did not significantly affect the likelihood of participating in photography or the level of interest in photography.

C5. **There is a significant difference in photographer type between groups of birders with various income levels.**

Table IV-17. Comparison of Participation in Photography with Birding Experience

Photographer Type	Frequency[1] by Birding Experience (yrs)				Total
	0-5	6-10	11-20	21 or more	
Non-photographer	119	78	77	75	349
	100.0	89.3	81.6	78.1	
	(3.61)	(1.43)	(.26)	(.12)	
Photographer	50	73	61	57	241
	69.0	61.7	56.4	53.9	
	(5.23)	(2.07)	(.38)	(.18)	

Statistics: X^2=13.28, 3 df, P=.03

[1] Observed frequency
Expected frequency
(Chi-square value)

Table IV-18. Comparison of Photography Type with Level of Birding Participation

Photographer Type	Frequency[1] by Participation Rate (days/year)			Total
	0-15	16-30	31 or more	
Snapshot	43	18	11	72
	30.5	17.9	23.6	
	(5.12)	(.00)	(6.73)	
General	39	32	34	105
	44.4	26.1	34.4	
	(.66)	(1.33)	(.00)	
Advanced	20	10	34	64
	27.1	15.9	21.0	
	(1.86)	(2.19)	(8.05)	

Statistics: X^2=25.94, 4 df, P=.00

[1] Observed frequency
Expected frequency
(Chi-square value)

Income level did not significantly affect the likelihood of participating in photography or the level of interest in photography.

C6. **There is a significant difference in photographer type between groups of birders with various educational attainment levels.** Educational attainment did not significantly affect the likelihood of participating in photography. Of the photographers, snapshot photographers were more likely to possess less than a bachelor's degree than to possess a bachelor's degree or more (X^2=7.04, 2 df, P=.03).

C7. **There is a significant difference in photographer type between various age groups of birders.** Age of birders did not significantly affect their likelihood of participating in photography. Birders aged 21-40 were more likely to be advanced photographers than snapshot photographers (Table IV-19). Birders aged 60 or older were more likely to be snapshot than advanced photographers.

C8. **There is a significant difference in photographer type between male and female birders.** Male birders were much more likely to participate in photography than female birders (Table IV-20). Advanced photographers were more likely to be male than female, and snapshot photographers were more likely to be female than male (Table IV-21).

In summary, photographic involvement tends to increase with experience level and participation rate. Male birders

Table IV-19. Comparison of Phototography Type with Age of Birders

Photographer	Frequency[1] by Age Group (years)				Total
	16-20	21-40	41-60	61 or more	
Snapshot	1 .9 (.01)	15 23.8 (3.25)	34 27.9 (1.33)	21 18.4 (.37)	71
General	1 1.3 (.07)	37 35.1 (.10)	35 41.3 (.96)	32 27.2 (.85)	105
Advanced	1 .8 (.05)	28 21.1 (2.26)	25 24.8 (.00)	9 16.3 (3.27)	63

Statistics: X^2=12.52, 6 df, P=.05

[1] Observed frequency
Expected frequency
(Chi-square value)

Table IV-20. Comparison of Participation in Phototography with Sex of Bird Watchers

Photographer Type	Frequency[1] by Sex		Total
	Male	Female	
Non-photographer	185 207.0 (2.34)	164 142.0 (3.41)	349
Photographer	165 143.0 (3.38)	76 98.0 (4.94)	241

Statistics: X^2=14.07, 1 df, P=.00

[1] Observed frequency
Expected frequency
(Chi-square value)

Table IV-21. Comparison of Phototography Type with Sex of Birders

Photographer Type	Frequency[1] by Sex		Total
	Male	Female	
Snapshot	38 49.3 (2.59)	34 22.7 (5.63)	72
General	77 71.9 (.36)	28 33.1 (.79)	105
Advanced	50 43.8 (.88)	14 20.2 (1.90)	64

Statistics: X^2=12.15, 2 df, P=.00

[1] Observed frequency
Expected frequency
(Chi-square value)

were much more involved in photography than female birders.

Distance Travelled

The estimate of one-way distance travelled was based on the most efficient road route from a birder's home to Point Pelee. Distances for overseas travellers were not used because of other intervening variables such as air travel, travel time, etc.

D1. **There is a significant difference in distance travelled between photographers and non-photographers.** Photographers travelled an average of 620 km to Point Pelee, and non-photographers travelled an average of 450 km (F=8.05, 1 df, P=.00).

D2. **There is a significant difference in distance travelled between various types of photographers.** No differences were found in distances travelled among various photographer types.

D3. **There is a significant difference in distance travelled between groups of birders with various experience levels.** No significant differences were found in distance travelled between groups of birders with various experience levels, but the data suggest that as a birder becomes more experienced, he/she tends to be willing to travel farther (Table A5-10). Mark (1981) offers an interesting explanation. Many birders emphasize "newness" and new experiences (eg. new birds to see) which require greater travel distances as birding opportunities near a birder's home become "used up." As birders become more experienced, they will have seen many of the birds and birding locations near their home and desire to travel further afield. This phenomenon was noted about birders travelling to the American Birding Association's national conventions in 1976 and 1978.

D4. **There is a significant difference in distance travelled between groups of birders with various participation rates.** Most committed birders (31 or more days/year birding) travelled an average of 678 km to Point Pelee, whereas moderately committed and least committed birders travelled an average of 561 and 371 km, respectively (F=10.83, 2 df, P=.00). The explanation suggested in subproposition D3 may also apply here.

D5. **There is a significant difference in distance travelled between birders with different countries of origin.** Of course, European birders travelled the farthest to bird at Point Pelee (all travelled by airplane). Canadians and Americans did not differ in distances travelled.

D6. **There is a significant difference in distance travelled between birders from urban residences and those from rural residences.** Residence size was not correlated with distance travelled. Smith (1985) found that urbanness was negatively correlated with willingness to travel.

D7. **There is a significant difference in distance travelled between groups of birders with various income levels.** The amount of income earned per person was not correlated with distance travelled.

D8. **There is a significant difference in distance travelled between groups of birders with various educational attainments levels.** No significant differences were found in distances travelled among 6 categories of educational attainment. However, birders with bachelor's degrees travelled an average of 573 km, while those without bachelor's degrees only travelled an average of 409 km (F=7.52, 1 df, P=.01)

D9. **There is a significant difference in distance travelled between various age groups of birders.** Using 4 age categories, the differences in distance travelled were not significant, but the trends suggest that older birders are willing to travel farther (Table A5-11). The "newness" factor may affect a birder's decision to travel afar.

D10. **There is a significant difference in distance travelled between male and female birders.** No difference in distance travelled was found between male and female birders.

In summary, distance travelled was positively correlated with participation rate, country of origin (more distant), and education, and insignificantly with experience level.

Length of Stay

Length of stay was the number of days that the respondent spent birding in Point Pelee and area on his/her present trip.

E1. **There is a significant difference in length of stay between photographers and non-photographers.** No difference in length of stay was found between photographers and non-photographers.

E2. **There is a significant difference in length of stay between various types of photographers.** No significant differences were found in average lengths of stay among various types of photographers.

E3.**There is a significant difference in length of stay between groups of birders with various experience levels.** More experienced birders stayed longer than less experienced birders (Table IV-22). Most experienced birders (21 or more years of birding) stayed an average of 4.1 days birding at Point Pelee, while the least experienced birders (0-5 years of birding) stayed an average of 2.6 days.

E4.**There is a significant difference in length of stay between groups of birders with various participation rates.** Length of stay increased significantly with an increase in birding intensity (Table IV-23).

E5. **There is a significant difference in length of stay between groups of birders with various levels of familiarity with Point Pelee.** No difference in length of stay was found

Table IV-22. Comparison of Length of Stay with Experience Level

Experience Level (# years birding)	Length of Stay (days)
0-5	2.55
6-10	3.30
11-20	3.86
21 or more	4.10

Statistics: F=8.07, 3 df, P=.00

Table IV-23. Comparison of Length of Stay with Participation Level

Participation Level (days/year birding)	Length of Stay (days)
1-15	2.66
16-30	3.31
31 or more	4.47

Statistics: F=20.85, 2 df, P=.00

between groups of birders with different levels of familiarity with Point Pelee.

E6. **There is a significant difference in length of stay between groups of birders who have travelled various distances from their origin to Point Pelee.** Average length of stay increased as birders travelled from farther away to bird at Point Pelee (Table IV-24). Birders travelling 250 km or less (one way) stayed an average of only 2.0 days, whereas birders travelling over 1000 km stayed an average of almost 5.9 days.

E7. **There is a significant difference in length of stay between birders with different countries or origin.** Average length of stay varied significantly between Canadians (3.6 days), Americans (2.8 days), and Europeans (10.7 days - F=66.19, 2 df, P=.00).

E8. **There is a significant difference in length of stay between various age groups of birders.** Length of stay was not correlated with age groups of birders.

E9. **There is a significant difference in length of stay between male and female birders.** No difference in length of stay was found between male and female birders.

In summary, length of stay was positively correlated with experience level, participation rate, distance travelled, and country of origin (more distant).

Table IV-24. Comparison of Length of Stay with Distance Travelled

Distance Travelled (km)	Average Length of Stay (days)
1-250	1.99
251-500	3.64
501-1000	3.80
10001 or more	5.88

Statistics= F=38.78, 3 df, P=.00

D. Other Economic Values Associated with Bird Watching

Other economic values associated with bird watching were assessed in an exploratory study, using a small subsample (n=18) and employing the Contingent Valuation Method (Appendix III). While the sample utilized in this study experiment is not sufficient in size to draw important conclusions, the results are interesting enough to report here, as demonstration of an avenue of potential future investigation.

Socio-economic and recreational characteristics of this subsample were similar to those of the larger sample.

Two respondents (11% of the subsample) gave up or lost opportunities to earn income as a result of his/her present trip to PPNP. Estimates of income lost were $548 and $2,000 for these respondents. In the southeastern United States, the average number of days pay lost to pursue nonconsumptive wildlife activities in 1971 was 6.3 (Horvath 1974).

An alternative method of measuring use value, other than to estimate willingness to pay, is to estimate willingness to accept compensation. These latter estimates of use value are often higher the former (Adamowicz and Phillips 1983, Davis 1985). The question "How much would someone have to pay you per day to NOT come birding at PPNP at all during this trip?" was asked to elicit willingness to accept compensation. The average response was $178.00/day (n=11), 135% larger than the previous estimate of willingness to pay for general bird watching (75.70/day).

In order to elicit estimates of inheritance and existence value, respondents were first asked which bird species that they would most like to see at PPNP. Rare bird species, such as the Prothonotary warbler, were most frequently reported (50%), as opposed to common, uncommon, very rare, or accidental species (Parks Canada 1981). When asked how much they would be willing to pay to see their most sought after bird species, birders reported an average of $74.38, approximately the value of an entire day of birding at Point Pelee.

In an attempt to measure inheritance value, birders were asked "If a contribution from you and others would ensure this bird's survival, thus ensuring the opportunity for your grandchildren to see this bird, what would you be willing to pay as a one-time contribution?" The responses (n=17) ranged from $25 to $1,000 and averaged $297.06. Based on an estimated 16,855 individual birders in May, the total inheritance value of sought after bird species could reach $4.7 million in May (94.4% response). For all of 1987, the estimate could be as high as $10.9 million.

Changes were then made on the question to determine existence value. Based on the limitation that no one, including the respondent, would be allowed into the sanctuary of the most sought after bird species, the average response was $263.24, and again ranged from $25 to $1,000 (n=17). Total existence value of most sought after bird species by Pelee birders is estimated to be $4.2 million in May and $9.6 million for all of 1987 (94.4% response).

To compare this estimate with other bird species, a standard was established for a bird more familiar to each respondent. Birders were asked "How much would you be willing to contribute to a program that ensures the survival of a common species such as the Chipping sparrow?" The responses (n=14) ranged from $2 to 500, and averaged $127.47, under half of the previous estimates for inheritance and existence values for more sought after bird species. Total existence value of the Chipping sparrow by Pelee birders is estimated to be $1.7 million in May and $3.8 million for all of 1987 (77.7% response).

In comparison, visitors to Aransas National Wildlife Refuge, Texas placed an average annual option price of $16.87 for Whooping cranes and an average annual existence value of $9.33 (Stoll and Johnson 1984). Combined option price and existence value is estimated to be $779,382 per year for refuge visitors and ranges from $0.57 to 1.58 billion for the United States population.

Brookshire et al. (1983) found that annual option prices for potential wildlife viewers were $21 and $23 for grizzly bears and bighorn sheep, respectively. Annual existence values averaged $24 and $7 for grizzly bears and bighorn sheep, respectively.

E. Responses to Research Goals

The foregoing data support the economic importance of the rapidly-growing sport of bird watching. With estiamtes of economic value and expenditures resulting from bird watching, more efficient decisions can be made regarding the management and planning of Point Pelee and other birding locations. The data generally support the objectives and theory laid out in earlier chapters.

Thus, referring back to the propositions in chapter I, the total economic value (efficiency value) of birding at Point Pelee represents a significant contribution to the net benefit of society. Economic efficiency values were only correlated with length of stay and income level. The substantial existence and inheritance values shown here confirmed their importance in economic valuation.

Economic impacts from expenditures on birding trips to Point Pelee had magnitudes which suggested tremendous societal and regional impacts. The major expenditure areas were on travel, food, accommodation, and equipment.

Socio-economic characteristics of bird watchers were unique, compared to those of the average Canadian. This suggests that innovative techniques are required to plan for and manage this particular user group. Photographer type, distance travelled, and length of stay offered interesting correlations with economic efficiency and impact values, and provided insights into specific characteristics of bird watchers.

The demand for bird watching has been shown to be significant, and at the same time, dynamic, as additional people participate in the sport and existing birders change their use patterns.

V. CONCLUSIONS

This thesis has sought to describe the economic nature of bird watching at Point Pelee National Park, considering the park's excellent international reputation for birding and the sport's increasing popularity. Expenditures and values of bird watchers, along with their socio-economic characteristics and interrelationships have been discussed and analyzed. This chapter provides a summary of these results, compares value estimates with other outdoor recreation activities, discusses the theoretical, management, and planning implications, and suggests needs for further research.

A. Summary of Results

Socio-economic and Recreational Characteristics

Bird watchers at Point Pelee National Park had above average educations (62% held bachelor's degrees) and incomes (average 1986 gross household income of $57,175). The average age was 49 years. Almost 60% were employed in professional occupations.

Fifty-one percent of the respondents were international visitors. Most of the birders were from Ontario (43%) or Michigan (24%). The average travel distance was 513 km for North American birders. Willingness to travel was positively influenced by birding participation rate and education.

Almost 41% of Pelee birders were photographers (12% were snapshot photographers, 18% general, and 11% advanced). Photographic involvement was positively correlated with experience level, birding participation rate, and male birders.

Average trip length to Point Pelee was 3.4 days, and was positively influenced by birding experience, participation rate, an distance travelled. Twenty percent of the respondents were first-time visitors to the park. The month of May accounted for 65% of the total birding gate visitation in 1987. Birders participate, on average, 36 days/year in their sport. The average Point Pelee birder has been actively bird watching for 15 years.

Economic Analysis of Bird Watching at Point Pelee

Net economic value of birding at PPNP amounted to $4.1 million in May, 1987, at a rate of $76/day, and is estimated to be $6.3 million for all of 1987. Daily rates of value decreased with length of stay at Point Pelee, but increased with a birder's income level.

Total expenditures resulting from bird watching trips to PPNP in May, 1987 amounted to $3.8 million, $2.1 million of which was spent locally in the Leamington area. The major expenditure areas were on travel (27%), food (26%), accommodation (23%), and equipment (13%). Birders spent, on average, $224/trip or $66/day of birding at Point Pelee and an estimated $5.4 million in 1987. Expenditure rates increased with photographic involvement, distance travelled, income, and education, but decreased with length of stay at Point Pelee. As well, male birders and middle-aged birders had high expenditure rates.

In an exploratory survey, substantial inheritance and existence values were found to exist for birds most sought after by visiting bird watchers, but the methodology requires further refinement.

B. Comparative Value of Outdoor Recreation Activities

The value estimates derived in this and other studies are important in determining net benefits resulting from a park, resource, or recreational activity. Value estimates are useful to complete benefit-cost analyses of proposed projects, and to determine the comparative worth of various resource uses, recreational and otherwise.

Many research studies have derived value estimates for numerous outdoor recreation activities. These serve to illustrate the tremendous economic importance of recreation on public and private wildlands. Table V-1 contains the average value/day estimates of selected recreational activities (in dollar values of the reported study year). Caution must be exercised when comparing dollar values

Table V-1. Value Estimates for Various Outdoor Recreation Activities

Activity	Study	Location	Study Year	Value/ day ($)
Bird Watching	Hvenegaard	PPNP, ON	1987	75.70[1]
Bird Enjoyment	Horvath (1974)	S.E. USA	1971	65.40
Nonconsumptive Wildlife Use	Richards[2] (1980)	S.E. Arizona	1977	79.00
Hiking	Rosenthal and Walsh (1986)	Colorado	1981	7.64
Deer Hunting	US Fish & Wildl. (1982)	USA	1980	27.32
Elk Hunting	Donnelly et al. (1988)	Idaho	1982	32.58
Deer Hunting	"	"	"	19.18
Steelhead Fishing	"	"	"	20.29
Fishing-warm water	"	"	"	14.25
Fishing-cold water	"	"	"	12.02
Upland Game Hunting	"	"	"	22.45
Pheasant Hunting	"	"	"	21.66
Waterfowl Hunting	"	"	"	12.05

[1] Reported in Canadian dollars; others in American dollars

[2] Used Travel Cost Method

unless they have been converted to real dollars for a base year, using a consumer price index, for example. Nevertheless, important trends can be seen. The studies included in the table (the choices are numerous) used the Contingent Valuation Method for valuation, were fairly recent (if possible for a type of activity), and were representative of a type of activity. Estimates of standardized value are outlined in Sorg and Loomis (1984, 1985) for many other types of outdoor recreation activities. On a value per day basis, bird watching compares favorably with many other outdoor recreation pursuits. Of course, sub-typologies of various wildlife recreation activiti[illegible] will have differing value estimates, depending on the phase of participation shown.

C. Theoretical Implications

Concepts developed from the results of this study serve to reinforce the present body of theoretical knowledge relevant to wildlife economics and outdoor recreation.

First, the magnitudes of economic values uncovered in this study reflect the tremendous importance of Point Pelee National Park as a bird watching destination, and as a significant economic asset to Ontario, Canada, and North America. The net economic value of bird watching at world-class locations like Point Pelee, in comparison to other activities, represents a significant benefit to society, and may lead to a change in policy regarding the management of the range of outdoor recreation activities. The impressive growth that the sport of bird watching is undergoing also needs to be recognized and considered in future decisions.

The economic impacts (ie. expenditures), on a societal and local basis, have been shown to represent significant contributions to diverse sectors of the economy. Wildlife recreation is important because it is renewable, generates activity in areas where few other opportunities exist, and provides additions to government revenue (Alberta Fish and Wildlife 1984). In North America, the sport of bird watching has been estimated to generate $25 to 30 billion (Butler 1984, Hvenegaard 1989), and much more worldwide.

Second, this study has outlined the predictive possibilities for estimating net economic benefits of bird watching at other important birding destinations. Other communities will be able to estimate the magnitude of economic impacts and values resulting from birding at nearby parks or sanctuaries.

Third, the methodology for measuring economic benefits has been used with success and ease, and resulting figures are comparable with other studies. Respondents in the sample were generally receptive to the approach taken in measuring expenditures and value. Methodologies used to measure other non-use values associated with bird watching can be refined, based on the exploratory results, to allow for more accurate and specific value assessments.

Fourth, bird watchers are clearly a unique user group, based on above-average income, education, and employment in professional occupations, and as a result, may possess a disproportionate amount of influence in society. This is encouraging, since many wildland and wildlife conservation struggles of concern to birders, and nonconsumptive wildlife users in general, are foreseen in the future. Because of their unique characteristics, bird watchers present special research opportunities relevant to the scope of wildlife recreation in the future. Findings will be useful for improving the planning and management of the resource and its users.

Finally, understanding the present trends in wildlife-oriented recreation, and the associated socio-economic aspects of the activities and their users, will allow wildlife conservation to gain political support (Filion 1988, Vickerman 1988). In addition to other arguments, wildlife conservation has a defendable economic argument, if the resource and its users are fully understood. For example, during the spring migration at Point Pelee, 319 different species of birds have been sighted. Of these, 307 have been sighted in May. On a per bird species basis, birding at Point Pelee in May results in $12,311 in economic impact value, and $13,461 in economic efficiency value.

D. Management and Planning Recommendations

Point Pelee National park and the community of Leamington benefited tremendously from the influx of bird watchers throughout the year, and especially in May. Park staff and community residents could potentially increase both the local economic impacts and net economic value if some or all of the following recommendations are implemented:

1. Recognize the present and future importance of bird watching in a regional context, realizing that Point Pelee offers a world-class birding experience, and incorporate economic impact assessments into the planning of the park and community.
2. Recognize that PPNP and other nearby birding attractions are significant assets in the role of the community's economy. The management of birding attractions should reflect its international popularity, and should include, besides park staff, all other affected parties, such as business operators, recreational groups, community planners, etc.
3. Implement further research studies to measure and assess bird watchers' motivations and satisfactions so that the net value gained from birding at PPNP can be maximized. Improvements made to improve satisfactions will likely increase the park's attractiveness, desirability to visit, and length of stay, all of which

will enhance societal and local economic benefits.

4. Recognize unique characteristics of bird watchers and realize the management implications required to satisfy this highly-educated and wealthy user group. For example, professional information, quality signage, appropriate infrastructure, and a pleasant atmosphere can enhance a birding experience. Successful efforts have already been made in this regard, but they need to be constantly evaluated and updated, and new ones need to be planned and implemented.
5. Depending on local economic goals, bird watching at Point Pelee can generate additional economic benefits, if steps are taken to promote year-round birding (especially in the fall) and to provide goods and services desired by birders (Butler and Hvenegaard 1989).

E. Needs for Further Research

In the course of this research effort, other research needs have become apparent. In particular, more attention needs to be given to the local economic impacts of bird watching. Analyzing the multiplier effects of incoming dollars and tracing those effects would lead to a greater understanding of local benefits. As well, the potential for growth should be examined and planned for, in light of the surge in bird watching's popularity.

In addition, by modelling the economic interactions in the Point Pelee-Leamington situation, other communities in close proximity to birding attractions can accurately estimate their economic benefits.

The Point Pelee birding experience, while focusing on the park, should include the many other birding attractions in the area. Effort should be made to explore the possibilities of promoting a regional birding experience which may be more attractive to visiting birders. For example, with sound planning and promotion, an attractive regional guide to birding in the area could provide additional revenue from sales, spread out economic benefits, minimize detrimental social and ecological impacts (as identified in Butler and Fenton 1988), and provide birders with necessary information to plan their trip.

In order to assess the full range of economic values associated with bird watching, the methodology used in the exploratory survey needs to be refined so that accurate and comparable estimates of option, existence, and inheritance value can be made.

Finally, the values and expenditures resulting from a bird watching experience depend, in large part, on satisfactions gained from the experience. Therefore, more effort should be directed toward the understanding of motivations, expectations, and satisfactions inherent in the sport.

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APPENDIX I

COPY OF MAIN SURVEY QUESTIONNAIRE

Point Pelee National Park User Survey - 1987

Visitor Interview Survey Form

Introductory Key Words: Have you been interviewed yet for the bird-watcher economics study?
University of Alberta and Point Pelee National Park
Interviewing birders
Ask a few questions, if I may
Answers kept strictly confidential

Date: May ___, 1987 Day of Week: S M T W T F S Time of Interview: ___:___ am/pm

Location/Place: ________________ Interviewer# ________________

Sex: M ___ F ___ Photographer Type: Snapshot ___ Advanced ___
General ___ Non ___

I'll start off with some questions about your trip to PPNP.

1. a) Is visiting the park the primary intent of your trip?
Yes ___
No ___, what is? ______________________________

b) Is birding your primary activity here at the park?
Yes ___
No ___, what is? ______________________________

2. a) How many years have you been an active birder? . . . . ___

b) Could you estimate how many days per year you spend on birding trips? . . . ___

3. a) How many times have you visited PPNP in the past? . . . . ___

b) How many birding trips to PPNP do you make per year? . . . . ___

(If more than 1 trip per year) How many days do you stay on those other birding trips, and when do those trips take place?

Jan	___	May	___	Sept	___
Feb	___	June	___	Oct	___
Mar	___	July	___	Nov	___
Apr	___	Aug	___	Dec	___

4. a) Where do you presently live?
Town/city ________________ Country ________________
Prov./state ________________ Postal code ________________

b) Do you live in an urban or rural setting? urban ___ rural ___

c) How many days will your entire trip last? . . . . ___

(If out-of-province) How many days will you spend in Canada? . . . . ___

How many days will you spend in Ontario? . . . . ___

d) How many days will you spend birding in PPNP and area on this trip? . . . . . ___

EXPENSES:

I'll now ask you some questions about your expenses involved in visiting PPNP. Please include both cash and credit card purchases.

(If not Canadian) Will you be answering in Canadian or American dollars?
Canadian ___
American ___

Could you estimate what you will have spent in total on .....

	Total Amount	Amount in Canada	Amount in local area (see map)	% of use for birding
a) Travel:				
Airfare	____	____	____	
Personal Vehicle	____	____	____	
Vehicle rental	____	____	____	
Other ________	____	____	____	
b) Food:				
Meals & beverages in restaurants and hotels	____	____	____	
Groceries & beverages bought in stores	____	____	____	
c) Accomodation:				
Hotel/motel	____	____	____	
Camping	____	____	____	
Stay with friends	____	____	____	
Other ________	____	____	____	
d) Film for PPNP	____	____	____	____
e) Social entertainment: (movies, sports, admissions, etc.)	____	____	____	
f) Souvenirs: (art, postcards, etc.)	____	____	____	
g) Other associated costs:				
________	____	____	____	
________	____	____	____	

We are trying to understand how important it is to come birding here at PPNP.

6. a) Considering the enjoyment you have received from birding here at PPNP, would you still have made this trip if your total costs had been more?
Yes ___
No ___

b) What is the most your costs on this trip could have risen before deciding not to come birding at PPNP?
________$
________% (play bidding game if no answer forthcoming; start at twice as much and adjust until answer changes. Eg. If your costs had doubled, would you still have made this trip?)

EQUIPMENT EXPENSES:

7. Key Words: Personally spent in the past 12 months
Birding items
Used for birding at Point Pelee

(If not Canadian) Will you be answering in Canadian or American dollars?
Canadian ___
American ___

	At Home	Enroute Canada	Enroute U.S.	Local Area	Total	% of use for birding
a. Binoculars	___	___	___	___	___	___
b. Camera equipment (lenses, tripods, accessories) . .	___	___	___	___	___	___
c. Tape recorders	___	___	___	___	___	___
d. Birdcall records or tapes . . .	___	___	___	___	___	___
e. Bird guides, books or magazines . .	___	___	___	___	___	___
f. Notebooks or pens . .	___	___	___	___	___	___
g. Footwear	___	___	___	___	___	___
h. Clothing (hats, shirts, jackets) . .	___	___	___	___	___	___
i. Packs, bags, carriers	___	___	___	___	___	___
j. Other items (sunglasses, insect repellent, bird squeakers, etc.)						
________________	___	___	___	___	___	___
________________	___	___	___	___	___	___
Total	___	___	___	___	___	___
%	___	___	___	___	___	___

(SHOW CARD)

8. How would you rate the quality of the following categories in the Leamington district?
(Ask for comments on items rated poor or very poor)

	Very Poor	Poor	Fair	Good	Very Good	No Opinion
a. Restaurants/lounges						
b. Accomodation						
c. Available information in district on the park						
L/P d. Available information on other natural areas						
e. Friendliness of people						
f. Helpfulness of people						

How would you rate the availability of the following items in stores(in relation to birding

	Very Poor	Poor	Fair	Good	Very Good	No Opinion
g. Binoculars						
h. Camera equipment						
i. Film						
j. Bird books and related field guides						
k. Related nature magazines						
l. Bird paintings, prints, carvings						
m. General souvenirs						
n. Footwear						
o. Field clothing						
p. Packs, bags, and carriers						

Comments: (record letter and comments for items rated poor or very poor)

9. a) What items might you have purchased in the Point Pelee-Leamington district, had they been available?

b) If you could have found these items and any other items you were looking for, up to how much might you have spent?
$ ________________

10. How could the park or community have better assisted your birding experience or activities while you were here? We'll be sure to pass the information along.

PARK	LEAMINGTON AND DISTRICT
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________

I'll finish off with a few questions about yourself.

11. Including yourself, how many of your immediate family are living at your household? _____

12. What is your usual occupation? ______________________________

13. (Show card) Birding expenditures are often related to household income, so I would like to ask you which category best estimates the gross income (before taxes) of your household in 1986?

A B C D E F G H I J K L M N

14. (Show card) Which category describes your highest level of education?

High School	7	8	9	10	11	12	13		
Technical/Vocational	1	2	3	4					
University/College	1	2	3	4	5	6	7	8	9

Highest degree obtained:

High School Diploma	____
Technical Diploma	____
Bachelor's . . .	____
Master's	____
Doctorate	____

15. What year were you born? 19____

Thanks for your valuable answers and time. The results of this survey should be available at the visitor centre by next spring. Have a good day ....

INTERVIEWER'S COMMENTS:

____

____

____

____

APPENDIX II

CODEBOOK FOR MAIN SURVEY QUESTIONNAIRE

Abbreviations used in codebook:

R = respondent
DK/NR = don't know/no response
NA = not applicable
Q = question
V = variable

VAR	Q	SIZE	COLUMNS	DESCRIPTION AND CODE
ID	-	f3	001-003	Questionnaire number/identification (#001-605)
v1	-	f2	004-005	Day of month, May 1-24, 1987
v2	-	f1	006	Day of week: 1-Sunday 2-Monday 3-Tuesday 4-Wednesday 5-Thursday 6-Friday 7-Saturday
v3	-	f4	007-010	Time of Interview in 24-hour time
v4	-	f1	011	Location of interview: 1-Visitor Center, Tram, Tip 2-Marsh Boardwalk 3-Tilden Woods
v5	-	f1	012	Interviewer: 1-Peter 2-Glen 3-Brent
v6	-	f1	013	Sex of R: 1-male 2-female 0-NR (mv)
v7	-	f1	014	Observed photographer type of R: 1-snapshot 2-general 3-advanced 4-non-photographer 8-not applicable (mv) (#001-007)
v8	1a	f1	015	Is visiting the park the primary intent of your trip?: 1-yes 2-no
v9	1b	f1	016	Is birding primary activity in park? 1-yes 2-no
v10	2a	f2	017-018	Years of active birding? (yrs)
v11	2b	f3	019-021	Days per year spent on birding trips? (days per year) 999-NR
v12	3a	f4	022-025	Times visited Point Pelee in past? (times)
v13	3b	f3	026-028	Birding trips to Point Pelee per year? (trips) (If v12=0, then v13=998-mv)
v14	3b	f2	029-030	Days stayed on other birding trips in the month of: If v13=0, then v14 to v25=0 January
v15	3b	f2	031-032	February
v16	3b	f2	033-034	March
v17	3b	f2	035-036	April

v18	3b	f2	037-038	May
v19	3b	f2	039-040	June
v20	3b	f2	041-042	July
v21	3b	f2	043-044	August
v22	3b	f2	045-046	September
v23	3b	f2	047-048	October
v24	3b	f2	049-050	November
v25	3b	f2	051-052	December
v26	4a	f2	053-054	Where do you presently live? City coded to a location (Supplement I) 17-Overseas 99-Unknown
v27	4a	f4	055-058	Distance between home and Point Pelee in kilometers by most efficient car travel 9999-Unknown
v28	4a	f2	059-060	Province/state of origin? (Supplement II) 01-12-Canadian provinces 20-70-American states 99-Overseas
v29	4a	f1	061	Country of origin? 1-Canada 2-USA 3-United Kingdom 4-West Germany
v30	4a	a6	062-067	Postal code? 000000-DK/NR
v31	4b	f1	068	Do you live in an urban/rural setting? 1-urban (<5000 people) 2-rural (>5000 people)
v32	4c	f3	069-071	Days on entire trip?
v33	4c	f3	072-074	Days on trip in Canada?
v34	4c	f2	075-076	Days on trip in Ontario?
v35	4c	f2	077-078	Days birding at PPNP and area on trip?
v36	5	f1	079	Trip expenses in?: 1-Canadian 2-American
v37	5a	f4	080-083	Travel: Airfare: total
v38	5a	f4	084-087	Canada
v39	5a	f4	088-091	local
v40	5a	f3	092-094	Vehicle: total
v41	5a	f3	095-097	Canada
v42	5a	f3	098-100	local
v43	5a	f3	101-103	Veh.rent: total
v44	5a	f3	104-106	Canada
v45	5a	f3	107-109	local
v46	5a	f3	110-112	Other: total
v47	5a	f3	113-115	Canada
v48	5a	f3	116-118	local

v49	5b	f3	119-121	Food: Restaurants: total
v50	5b	f3	122-124	Canada
v51	5b	f3	125-127	local
v52	5b	f3	128-130	Groceries: total
v53	5b	f3	131-133	Canada
v54	5b	f3	134-136	local
v55	5c	f3	137-139	Accommod'n: Hotel/Motel: total
v56	5c	f3	140-142	Canada
v57	5c	f3	143-145	local
v58	5c	f3	146-148	Camping: total
v59	5c	f3	149-151	Canada
v60	5c	f3	152-154	local
v61	5c	f3	155-157	Friends: total
v62	5c	f3	158-160	Canada
v63	5c	f3	161-163	local
v64	5c	f3	164-166	Other: total
v65	5c	f3	167-169	Canada
v66	5c	f3	170-172	local
v67	5d	f3	173-175	Film for PPNP: total
v68	5d	f3	176-178	Canada
v69	5d	f3	179-181	local
v70	5d	f3	182-184	% of film used for birding
v71	5e	f3	185-187	Social entertainment: total
v72	5e	f3	188-190	Canada
v73	5e	f3	191-193	local
v74	5f	f3	194-196	Souvenirs: total
v75	5f	f3	197-199	Canada
v76	5f	f3	200-202	local
v77	5g	f3	203-205	Other costs 1: total
v78	5g	f3	206-208	Canada
v79	5g	f3	209-211	local
v80	5g	f3	212-214	Other costs 2: total
v81	5g	f3	215-217	Canada
v82	5g	f3	218-220	local
v83	6a	f1	221	Would you have made this trip if your costs had been more?: 1-yes 2-no
v84	6b	f4	222-225	What is the most your costs on this trip could have risen before deciding not to come birding at PPNP? -in dollars 9999-NR
v85	6b	f4	226-229	-in percentage above present costs 9999-NR
v86	7	f1	230	Equipment expenses in: 1-Canadian 2-American
v87	7a	f4	231-234	Binoculars: home
v88	7a	f4	235-238	enroute-Canada
v89	7a	f4	239-242	-USA
v90	7a	f4	243-246	local
v91	7a	f4	247-250	total

v92	7a	f3	251-253		% of use for birding
v93	7b	f4	254-257	Camera Eq't:	home
v94	7b	f4	258-261		enroute-Canada
v95	7b	f4	262-265		-USA
v96	7b	f4	266-269		local
v97	7b	f4	270-273		total
v98	7b	f3	274-276		% of use for birding
v99	7c	f4	277-280	Tape recorders:	home
v100	7c	f4	281-284		enroute-Canada
v101	7c	f4	285-288		-USA
v102	7c	f4	289-292		local
v103	7c	f4	293-296		total
v104	7c	f3	297-299		% of use for birding
v105	7d	f4	300-303	Birdcall records or tapes:	home
v106	7d	f4	304-307		enroute-Canada
v107	7d	f4	308-311		-USA
v108	7d	f4	312-315		local
v109	7d	f4	316-319		total
v110	7d	f3	320-322		% of use for birding
v111	7e	f4	323-326	Bird guides, books, or magazines:	home
v112	7e	f4	327-330		enroute-Canada
v113	7e	f4	331-334		-USA
v114	7e	f4	335-338		local
v115	7e	f4	339-342		total
v116	7e	f3	343-345		% of use for birding
v117	7f	f4	346-349	Notebooks/pens:	home
v118	7f	f4	350-353		enroute-Canada
v119	7f	f4	354-357		-USA
v120	7f	f4	358-361		local
v121	7f	f4	362-365		total
v122	7f	f3	366-368		% of use for birding
v123	7g	f4	369-372	Footwear:	home
v124	7g	f4	373-376		enroute-Canada
v125	7g	f4	377-380		-USA
v126	7g	f4	381-384		local
v127	7g	f4	385-388		total
v128	7g	f3	389-391		% of use for birding
v129	7h	f4	392-395	Clothing:	home
v130	7h	f4	396-399		enroute-Canada
v131	7h	f4	400-403		-USA
v132	7h	f4	404-407		local
v133	7h	f4	408-411		total
v134	7h	f3	412-414		% of use for birding
v135	7i	f4	415-418	Packs, bags, or carriers:	home
v136	7i	f4	419-422		enroute-Canada
v137	7i	f4	423-426		-USA
v138	7i	f4	427-430		local
v139	7i	f4	431-434		total
v140	7i	f3	435-437		% of use for birding

v141	7j	f4	438-441	Other items 1: home
v142	7j	f4	442-445	enroute-Canada
v143	7j	f4	446-449	-USA
v144	7j	f4	450-453	local
v145	7j	f4	454-457	total
v146	7j	f3	458-460	% of use for birding
v147	7j	f4	461-464	Other items 2: home
v148	7j	f4	465-468	enroute-Canada
v149	7j	f4	469-472	-USA
v150	7j	f4	473-476	local
v151	7j	f4	477-480	total
v152	7j	f4	481-483	% of use for birding
				How would you rate the quality of the following categories in the Leamington district? 1-very poor 2-poor 3-fair 4-good 5-very good 6-no opinion 8-not applicable
v153	8a	f1	484	Restaurants/lounges
v154	8b	f1	485	Accommodation
v155	8c	f1	486	Available inform'n in district on park
v156	8d	f1	487	Available inform'n on other nat'l areas: district
v157	8d	f1	488	park
v158	8e	f1	489	Friendliness of people: district
v159	8e	f1	490	park
v160	8f	f1	491	Helpfulness of people: district
v161	8f	f1	492	park
v162	8g*	f1	493	Availability of equipment and clothing useful in birding: district (#249-605)
v163	8g*	f1	494	park
v164	8g	f1	495	Availability of the following items in stores (in relation to birding): Binoculars: district (#001-248)
v165	8g	f1	496	park
v166	8h	f1	497	Camera equipment: district
v167	8h	f1	498	park
v168	8i	f1	499	Film: district
v169	8i	f1	500	park
v170	8j	f1	501	Bird books and related field guides: district
v171	8j	f1	502	park
v172	8k	f1	503	Related nature magazines: district

v173	8k	f1	504	park
v174	8l	f1	505	Bird paintings, prints, and carvings: district
v175	8l	f1	506	park
v176	8m	f1	507	General souvenirs: district
v177	8m	f1	508	park
v178	8n	f1	509	Footwear: district
v179	8n	f1	510	park
v180	8o	f1	511	Field clothing: district
v181	8o	f1	512	park
v182	8p	f1	513	Packs, bags, and carriers: district
v183	8p	f1	514	park
v184	9a	f2	515-516	What items might you have purchased in the Point-Pelee Leamington district, had they been available? -Respondent listed as many items as desired; coded first six. -Not covered in this thesis. Item 1
v185	9a	f2	517-518	Item 2
v186	9a	f2	519-520	Item 3
v187	9a	f2	521-522	Item 4
v188	9a	f2	523-524	Item 5
v189	9a	f2	525-526	Item 6
v190	9b	f4	527-530	If you could have found these items and any other items you were looking for, up to how much might you have spent? $ 9998-not applicable
v191	10a	f2	531-532	How could the park have better assisted your birding experience or activities while you were here? -Respondent listed as many items as desired; coded first four. -Not covered in this thesis. Item 1
v192	10a	f2	533-534	Item 2
v193	10a	f2	535-536	Item 3
v194	10a	f2	537-538	Item 4
v195	10b	f2	539-540	How could the community have better assisted your birding experience or activities while you were here? -Respondent listed as many items as desired; coded first four. -Not covered in this thesis. Item 1

v196	10b	f2	541-542	Item 2
v197	10b	f2	543-544	Item 3
v198	10b	f2	545-546	Item 4
v199	11	f1	547	Including yourself, how many of your immediate family are living at your household?
v200	12a	f4	548-551	What is your usual occupation? -See Supplements III and IV.
v201	12b	f1	552	Work status: 1-working 2-retired 3-student 4-unemployed 5-housewife
v202	13	f2	553-554	Which category best estimates the gross income (before taxes) of your household in 1986?: (all figures in Canadian $) 0-NR 1-0-9,999 2-10-19,999 3-20-29,999 4-30-39,999 5-40-49,999 6-50-59,999 7-60-69,999 8-70-79,999 9-80-89,999 10-90,99,999 11-100-109,999 12-110-119,999 13-120,129,999 14-130,000 +
v203	14a	f2	555-556	Which category describes your highest level of education? Respondents circled one number in each of the rows that they had received formal education in. If only the latter 2 categories had responses, we assumed they had 12 years of high school, even though some Ontario schools require 13 years of high school. Responses coded as years of education.
v204	14b	f1	557	Highest degree obtained: 1-high school diploma 2-technical diploma 3-bachelor's degree 4-master's degree 5-doctorate 6-high school incomplete
v205	15	f2	558-559	What year were you born? 19__.

Supplement I

Location of respondent's residents: (Question 4)

CODE	NAME	COUNTY CENSUS DIVISION (CCSD) OR
01-12	Canadian provinces other than Ontario (08) and Quebec (10)	
20-70	American states other than Michigan (45), Illinois (36), Indiana (37), Ohio (56), Pennsylvania (59), and New York (55).	
17	Overseas	
99	Unknown	
71	Mersea c.	37 (CCSD 004)
72	Windsor	37 (CCSD 039)
73	Essex c.	37 (all except CCSD's 004 and 039)
74	Kent-Chatham area	36
75	London-Sarnia area	34, 38, 39(except CCSD 036)
76	London	39 (CCSD 036)
77	Hamilton-Kitchener-Guelph area	21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 32, 40, 41, 42
78	Toronto	20
79	North-cental Ontario	09, 10, 11, 12, 13, 14, 15, 16, 18, 19, 43, 44, 46, 47, 48, 49
80	Ottawa-Cornwall area	01, 02, 03, 04, 05, 07, 08
81	Ottawa	06
82	Northern Ontario	51, 52, 53, 54, 56, 57, 58, 59, 60
83	Montreal-Laval	64, 65
84	Quebec City	20
85	Other Quebec	01 to 98 (except CD's 20, 64, 65)
86	Detroit-Wayne c.	Wayne c.
87	Ann Arbor-Washtenaw c.	Washtenaw c.
88	Oakland c.	Oakland c.
18	East Michigan	Huron, Sanilac, Tuscola, St. Clair, Lapeer, Genesee, Shiawassee, Ingham, Livingston, Macomb, Jackson, Hills-dale, Lenawee, and Monroe counties.
89	Grand Rapids-Kent c.	Kent c.
90	West Michigan	All other Michigan counties.
91	Chicago-Cook c.	Cook c.
92	Other Illinois	All other Illinois counties.
93	Indianapolis-Marian c.	Marian c.

94	Other Indiana	All other Indiana counties.
95	Toledo-Lucas c.	Lucas c.
96	Cleveland, Cuyahoga c.	Cuyahoga c.
97	Other Ohio	All other Ohio counties.
98	Pittsburgh-Allegheny c.	Allegheny c.
13	Other Pennsylvania	All other Pennsylvania counties.
14	Buffalo-Erie c.	Erie c.
15	Rochester-Monroe c.	Monroe c.
16	Other New York	All other New York counties.

Supplement II

Respondent's province or state of origin: (Question 4)

CODE	PROVINCE OR STATE
01	Alberta
02	British Columbia
03	Manitoba
05	Newfoundland
07	Nova Scotia
08	Ontario
10	Quebec
11	Saskatchewan
22	Arizona
23	Arkansas
24	California
25	North Carolina
28	Connecticut
32	Florida
36	Illinois
37	Indiana
38	Iowa
40	Kentucky
42	Maine
43	Maryland
44	Massachusetts
45	Michigan
46	Minnesota
48	Missouri
50	Nebraska
53	New Jersey
54	New Mexico
55	New York
56	Ohio
58	Oregon
59	Pennsylvania
62	Texas
65	Virginia
67	Washington
68	Wisconsin
70	Washington, District of Columbia
99	Overseas

Supplement III

What is your usual occupation? (Question 12)
-four-digit code, coded by first 2 digits

CODE	OCCUPATIONAL GROUP
11	managerial, administrative and related occ.
21	occ. in natural sciences, engineering and mathematics
23	occ. in social sciences and related fields
25	occ. in religion
27	teaching and realted occ.
31	occ. in medicine and health
33	artistic, literary, recreational and related occ.
41	clerical and related occ.
51	sales occ.
61	service occ.
71	farming, horticultural and animal husbandry occ.
73	fishing, trapping and realted occ.
75	forestry and logging occ.
77	mining and quarrying including oil and gas field occ.
81/82	processing occ.
83	machining and related occ.
85	product fabricating, assembling and repairing occ.
87	construction trades occ.
91	transport equipment operating occ.
93	material handling and realted occ., n.e.c.
95	other crafts and equipment operating occ.
99	occupations not elsewhere classified
00	persons not classifiable by occupation
9600	housewife
9800	student

Supplement IV

What is your usual occupation? (Question 12)
-occupations recoded, using Pineo's (1985) reclassification strategy:

CODE	OCCUPATION CLASSIFICATION
1	self-employed professional
2	employed professional
3	high level management
4	semi professionals
5	technicians
6	middle management
7	supervisors
8	foremen and women
9	skilled clerical, sales, and service
10	skilled crafts and trades (manual)
11	farmers
12	semi skilled clerical, sales, and service
13	semi skilled manual
14	unskilled clerical, sales, and service
15	unskilled manual
16	farm labourers

APPENDIX III

COPY OF EXPLORATORY SURVEY QUESTIONNAIRE

Point Pelee and Area User Survey - 1987

Visitor Interview Survey Form

Introductory Key Words: University of Alberta
Study of values people place upon bird-watching
Ask a few questions, if I may

Date: May ___, 1987 Day of Week: S M T W T F S Time of Interview: ___:___ am/pm

Location/Place: ____________________ Interviewer: ____________________

Sex: M ___ F ___ Photographer Type: Snapshot ___ Advanced ___
General ___ Non ___

---

1. Have you or will you visit Point Pelee on this bird-watching trip? Yes ___
No ___

2. How many years have you been an active birder? . . . . ____

3. Could you estimate how many days per year you spend on birding trips? . . ____

I'll direct the next several questions to concern your trip to PPNP.

4. a) Considering the enjoyment you have received from birding at PPNP, would you still have made this trip if your total costs had been more?
Yes ___
No ___

b) What is the most your costs on this trip could have risen before deciding not to come birding at PPNP? $__________ OR __________%

5. How much would someone have to pay you per day to NOT come birding at PPNP at all during this trip?
$________

6. Did you give up or lose opportunities to earn income as a result of your present trip to PPNP? (disregard if on holidays, are unemployed, etc.)
Yes ___, how much for the entire trip? $_______
No ___

7. a) Which bird species would you most like to see at PPNP, over any other species?
____

b) If you could be guaranteed to see a _____ today, how much would it be worth to you during your present visit?
$________

c) If a contribution from you and others would ensure the _____'s survival, thus ensuring the opportunity for your grandchildren to see this bird, what would you be willing to pay as a one-time contribution?
$_________

d) Would you still be willing to contribute if no one were allowed into the ______ sanctuary, including yourself?
Yes, same amount ___
Yes, but less ___, how much? $_________
No . . . . . . ___

e) Would you be willing to contribute to a program that ensures the survival of a common species such as the chipping sparrow?
Yes ___, how much $________
No ___

I'll finish off with a few questions about yourself.

8. Where do you presently live?
Town/city ____________________ Country ____________________
Prov./state ____________________ Postal code ____________________

Is that in an urban or rural setting?
urban _____ rural _____

9. Including yourself, how many of your immediate family are living at your household? _____

10. What is your usual occupation? ______________________________

11. (Show card) Birding expenditures are often related to household income, so I would like to ask you which category best estimates the gross income (before taxes) of your household in 1986?

A B C D E F G H I J K L M N

12. (Show card) Which category describes your highest level of education?

High School	7	8	9	10	11	12	13		
Technical/Vocational	1	2	3	4					
University/College	1	2	3	4	5	6	7	8	9

Highest degree obtained:
High School Diploma ____
Technical Diploma ____
Bachelor's . . . ____
Master's . . . . ____
Doctorate . . . . ____

13. What year were you born? 19____

Thanks for your valuable answers and time. The results of this survey should be available at the visitor centre by next spring. Have a good day ....

INTERVIEWER'S COMMENTS: ______________________________

APPENDIX III

CODEBOOK FOR EXPLORATORY SURVEY QUESTIONNAIRE

Abbreviations used in codebook:

R = respondent
DK/NR = don't know/no response
NA = not applicable
Q = question
V = variable

VAR	Q	SIZE	COLUMNS	DESCRIPTION AND CODE
ID	-	f2	01-02	Questionnaire number/identification (#01-18)
v1	-	f2	03-04	Day of month in May, 1987
v2	-	f1	05	Day of week: 1-Sunday 7-Saturday
v3	-	f4	06-09	Time of Interview in 24-hour time
v4	-	f1	10	Location of interview: 1-Hillman Marsh
v5	-	f1	11	Interviewer: 1-Glen
v6	-	f1	12	Sex of R: 1-male 2-female
v7	-	f1	13	Observed photographer type of R: 1-snapshot 2-general 3-advanced 4-non-photographer 8-not applicable
v8	1	f1	14	Visited PPNP on this trip? 1-yes 2-no
v9	2	f2	15-16	Years of active birding?
v10	3	f3	17-19	Days per year spent on birding trips? 999-NR
v11	4a	f1	20	Would you have made this trip if your costs had been more? 1-yes 2-no
v12	4b	f4	21-24	What is the most your costs on this trip could have risen before deciding not to come birding at PPNP? -in dollars 9999-NR
v13	4b	f4	25-28	-in percentage 9999-NR
v14	5a	f3	29-31	How much would someone have to pay you per day to not come birding at PPNP? 999-NR
v15	5b	f1	32	Days at PPNP on this trip? 9-NR
v16	6a	f1	33	Did you lose income for this trip? 1-yes 2-no
v17	6b	f4	34-33	How much for the entire trip? 9999-NR
v18	7a	f2	38-39	Which bird species would you most like at PPNP? (see Supplement I) 10-common 20-uncommon 30-rare 40-very rare 50-accidental

v19	7b	f3	40-42	If you could be guaranteed to see a ___ today, how much would it be worth? 999-NR
v20	7c	f4	43-46	If a contribution would ensure its survival, what would you be willing to pay? 9999-NR
v21	7d	f1	47	Would you still be willing to contribute if no one were allowed in the sanctuary 1-yes, same amount 2-yes, but less 3-no
v22	7d	f4	48-51	How much for a contribution? 9999-NR
v23	7e	f1	52	Would you be willing to contribute to a program that ensures the chipping sparrow's survival? 1-yes 2-no
v24	7e	f3	53-55	How much for a contribution? 999-NR
v25	8a	f2	56-57	Where do you presently live? (see Appendix II)
v26	8b	f4	58-61	Distance between home and Point Pelee in kilometers by most efficient car travel route 9999-unknown
v27	8c	f2	62-63	Province/state of origin? (Appendix II)
v28	8d	f1	64	Country? 81-Canada 2-USA
v29	8e	a6	65-70	Postal code? 000000-Dk/NR
v30	8f	f1	71	Is that in an urban or rural setting? 1-urban 2-rural
v31	9	f1	72	Including yourself, how many of your immediate family are living at your household?
v32	10a	f4	73-76	What is your usual occupation? (see Appendix II)
v33	10b	f1	77	Working status? 1-working 2-retired 3-student 4-unemployed 5-housewife
v34	11	f2	78-79	Which category best estimates the gross income(before taxes) of your household in 1986? (Canadian $)

				0-NR 1-0-9,999 2-10-19,999 3-20-29,999 4-30-39,999 5-40-49,999 6-50-59,999 7-60-69,999 8-70-79,999 9-80-89,999 10-90-99,999 11-100-109,999 12-110-119,999 13-120-129,999 14-130,000+
v35	12a	f2	80-81	Which category describes your highest level of education? Respondents circled one number in each of the rows that they had received formal education in. If only the latter 2 categories had responses, we assumed they had 12 years of high school, even though some Ontario schools require 13 years of high school. Responses coded a years of education.
v36	12b	f1	82	Highest degree obtained? 1-high school diploma 2-technical diploma 3-bachelor's degree 4-master's degree 5-doctorate 6-high school incomplete
v37	13	f2	83-84	What year were you born? 19__

Supplement I

Which bird species would you most like to see at PPNP, over any other species? (coded according to Parks Canada (1981))

TYPE	CODE	BIRD
Common	11	Wood duck
	12	Scarlet tanager
	13	Ruby-throated hummingbird
Uncommon	21	Least bittern
	22	Cerulean warbler
Rare	31	Loons
	32	rare warblers
	33	Connecticut warbler
	34	Prothonotary warbler
	35	Worm-eating warbler
	36	Kentucky warbler
Very rare	41	Scissor-tailed flycatcher
	42	Swainson's warbler
	43	Red-throated loon
Accidental	51	Swallow-tailed kite

APPENDIX V

ADDITIONAL DATA TABLES FOR REFERENCE

Table A5-1. Comparison of Value and Expenditures Per Day with Length of Stay

Length of Stay (days)	Value Per Day ($)	Expenditure Per Day ($)
Day User	117.48	54.22
2-3	82.47	75.58
4 or more	81.67	72.28
Statistics:	F=3.12, 2 df, P=.05	F=6.90, 2 df, P=.00

Table A5-2. Comparison of Value Per Day with Income Levels

Income Per Individual ($)	Value Per Day ($)
0-15000	67.49
15001-30000	81.43
30001 or more	124.24

Statistics: F=6.96, 2 df, P=.00

Table A5-3. Comparison of Expenditures for Photographers and Non-photographers

Expenditure	Non-Photographer	Photographer	Statistics	
	-- Dollars --		F	P
Expenditure/day	57.75	85.45	31.98	.00
Travel/day	49.76	70.22	23.62	.00
Equipment/year	159.64	293.99	14.41	.00
Camera Equipment/yr	12.39	130.69	23.62	.00
Film/trip to PPNP	.61	27.32	32.43	.00

Note: 1 degree of freedom for each test of analysis of variance

Table A5-4. Comparison of Expenditures with Type of Photographer

Expenditure Category	Type of Photographer			Statistics	
	Snapshot	General	Advanced	F	P
	-- Dollars --				
Expenditure/day	71.41	80.88	108.72	5.33	.01
Travel/day	60.39	68.83	83.56	2.65	.07
Equipment/year	136.27	221.95	589.62	12.75	.00
Camera Equipment/year	15.63	65.04	367.85	11.35	.00
Bird Literature/year	21.82	47.48	67.63	3.92	.02
Film/PPNP trip	2.35	14.35	76.67	16.06	.00

Note: 2 degrees of freedom for each test of analysis of variance

Table A5-5. Comparison of Annual Equipment Expenditures and Birding Experience

Birding Experience (years)	Annual Equipment Expenditure ($)
0-2	74.41
3-10	268.51
11-20	194.39
21 or more	182.12

Statistics: F=4.05, 3 df, P=.01

Table A5-6. Comparison of Expenditures and Familiarity with PPNP

Familiarity with PPNP (# previous visits)	Expenditures Per Day ($)
0-1	91.90
2-5	64.31
6 or more	54.77

Statistics: F=23.43, 2 df, P=.00

Table A5-7. Comparison of Expenditures and Distance Travelled

Distance Travelled (km)	Expenditures Per Day ($)
1-250	46.24
251-500	63.79
501-1000	83.58
1001 or more	119.71

Statistics: F=37.53, 3 df, P=.00

Table A5-8. Comparison of Travel Costs with Age Group of Bird Watchers

Age Group (years)	Expenditure/ day ($)	Travel/ day ($)	Hotel-Motel/ day ($)	Restaurants/ day ($)
16-20	23.93	17.07	1.67	1.07
21-40	62.21	48.61	7.46	9.33
41-60	78.22	65.54	15.51	16.44
61 or more	63.05	57.23	14.76	13.61
Statistics:	F=4.47 P=.00	F=5.40 P=.00	F=10.79 P=.00	F=8.26 P=.00

Note: 2 degrees of freedom for each test of analysis of variance

Table A5-9. Comparison of Participation in Phototography with Country of Origin

Photographer Type	Country of Origin			Total
	Canada	U.S.	Europe	
	-- Frequency[1] --			
Non-photographer	177	168	4	349
	169.8	169.2	10.1	
	(.31)	(.01)	(3.68)	
Photographer	110	118	13	241
	117.2	116.8	6.9	
	(.44)	(.01)	(5.39)	

Statistics: $X^2=9.84$, 2 df, P=.01

[1] Observed frequency
Expected frequency
(Chi-square value)

Table A5-10. Comparison of Distance Travelled with Experience Level

Birding Experience (years)	Distance Travelled (km)
0-2	308.6
3-10	518.5
11-20	558.4
21 or more	548.4

Statistics: F=2.01, 3 df, P=.11

Table A5-11. Comparison of Distance Travelled with Age Group

Age Group (years)	Distance Travelled (km)
16-20	199.2
21-40	481.8
41-60	452.9
61 or older	611.6

Statistics: F=2.24, 3 df, P=.08